Educational Implications of the Philosophy of Kenneth Boulding

Charles Tandy, Ph.D.
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EDUCATIONAL IMPLICATIONS OF THE PHILOSOPHY OF KENNETH BOULDING

A Dissertation

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the Faculty of the Graduate School

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In Partial Fulfillment

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Doctor of Philosophy

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by

CHARLES TANDY

Dr. Irv Cockriel, Dissertation Supervisor

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Dedicated to

June Jones Tandy Craig

(That's you, Mom!)

Everything is what it is because it got that way.
--Kenneth Boulding
(Ecodynamics, p. 49)

Father, it is your ghost which drove me to this odyssey.
--Virgil
(Aeneid, 6.695-7)

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ACKNOWLEDGMENTS

Kenneth Boulding's philosophy suggests that establishing a society of loving parents would tend to promote a culture of learning. I was fortunate in having experienced a loving family--in this case two parents and two sisters; I must also acknowledge Lucy Satterfield (now deceased), a provider of childcare, who did indeed provide me her sincere attention, even her personal concern and affection, while both my parents worked.

Formal schooling was unsuccessful in teaching me to read. I learned to read on my own, buying Superman comic books and roaming through the "hall" (singular) of the local public library (at first, simply enjoying large pictures and illustrations found in books located in the children's section). My mother and my paternal grandmother used to read me stories; this too was enjoyable although for some time I assumed it would always be far easier to have them read to me, rather than ever having to actually learn to read myself! Having said what I have said, I must nevertheless further acknowledge that more than a few of my teachers at the elementary and at the secondary levels were indeed rather good.

In preparing the present study, Irv Cockriel and John Kultgen were unusually generous with their time. I believe I was most fortunate in having them as my

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University professors beyond the gates of UMC must also be acknowledged. Their words of encouragement have been gratifying; I hope to fulfill their expectations. Boulding himself died this year (1993) on March 18, but not before providing me dissertation assistance. I am of the opinion that the philosophy of the late Kenneth Boulding has potential for expanding its niche and

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creating evolutionary potential. My longtime friend Gerald J. Gruman (history of ideas) continues to inspire me in my intellectual activity more than he will ever know; indeed, he is one of my spiritual or intellectual parents. Harris L. Gruman (comparative literature) has an excellent philosophic turn of mind which he integrates with other areas of expertise, thus providing me with stimulating feedback. In recent years the world renown educational philosopher, Malcolm S. Knowles, has provided me assistance and encouragement as I have attempted to enhance one of his social inventions--a postmodern or ecological system of community based education.

Finally, I wish to acknowledge philosophers Thomas O. Buford (Furman University) and George F. Parker (University of Louisville) for introducing me, just out of high school, to the world of higher education and the wonders of philosophic reflection. It was by their example that they taught me the meaning of philosophy: Philosophy is not primarily a game or a specialization; it is a way of life. Buford and Parker are responsible for first introducing me to the thought of Boulding (The Meaning of the Twentieth Century plus a "live" Boulding lecture delivered in Louisville, Kentucky). It was from Buford and Parker that I learned the importance of liberal education and interdisciplinary studies. In recent years, my undergraduate mentor Tom Buford--either

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directly or via the philosophy journal he edits--continues to stimulate me to pursue the great adventure.

Our interdisciplinary quest for intellectual excellence and compassionate commitment continues. The evolutionary story has only just begun.

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ABSTRACT

The purpose of the study is to 1) describe Kenneth Boulding's general social philosophy; 2) report Boulding's thoughts about learning and education; 3) locate, assemble, and articulate existing discourse-units critical of Boulding; 4) summarize and evaluate the specifically education-related criticisms of Boulding; and, 5) rationally reconstruct Boulding's philosophy so as to engender or identify some of its education-related implications. The dissertation consists of five chapters (and one appendix). Chapter 1 introduces and outlines the investigation. Chapter 2 describes Boulding's general social philosophy, based on his Ecodynamics. Chapter 3 presents Boulding's thoughts about learning and education, based on The Image and his Collected Papers. Chapter 4 locates, assembles, and articulates existing criticisms of Boulding. (In an appendix to the work, each of the discourse-units critical of Boulding is

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examined in turn.) Chapter 5 summarizes and evaluates the specifically education-related criticisms of Boulding; then Boulding's philosophy is rationally reconstructed so as to engender or identify some of its education-related implications, by asking the following leading question: "What would the structure of 'Boulding University' look like, and what is its mission for world leadership?"

The dissertation locates, assembles, and articulates 137 discourse-units critical of Boulding; summarizes and evaluates 36 education-related criticisms of Boulding; and, articulates the implications of Boulding's philosophy for the structure, mission, and curriculum of a twenty-first century university. It is concluded that Boulding's core curriculum (required of all elementary, secondary, and college undergraduate students) would teach 1) how to learn as an ongoing lifelong process; and, 2) how to think globally as a context for the advancement of moral identity.

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CHAPTER 1

INTRODUCTION

Social scientist-philosopher Kenneth Ewart Boulding (born in 1910) is a prolific writer and an academician of world stature. Among many other accomplishments, he has constructed an integrated social philosophy published as a book entitled Ecodynamics; in addition, he has published numerous journal articles specifically related to education and learning, and a book, The Image, which explains his epistemology. Nevertheless, doctoral dissertations and scholarly books in the fields of education and philosophy--focused primarily on Boulding--remain relatively rare.

A Preface to the Story[1]

> At any moment any atom may deviate slightly from its course.
>
> --Epicurus

> There is no Excellent Beauty that hath not some strangeness in the proportion.
>
> --Francis Bacon

> One wave started at the beginning of eternity breaks into component waves, and at once the theory of interference begins to operate.
>
> --D'Arcy Thompson

> Ecodynamics.
>
> --Kenneth Boulding

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Purpose and Outline of the Investigation

Kenneth E. Boulding was born on January 18, 1910 in Liverpool, England; he was an only child.[2] On the one hand, Boulding is a professional academician; on the other hand, he is a religious believer. For much of his life he tended to keep these two selves separate. Yet each sphere seemed to develop so as to emphasize the value of integration or wholeness. Boulding is convinced that we should attempt to transcend civilization's fragmentation of knowledge and psychosocial alienation with a postcivilized quest for integrated living and learning.

Kenneth Boulding is a highly regarded economist, educator, systems scientist, and interdisciplinary philosopher. He has published over three dozen books and over one-hundred dozen articles. Current Contents found him to be one of those rare authors of a "Citation Classic." Indeed, even more rare, he is the author of two citation classics. Boulding has been cited, according to the Social Science Citation Index, more than 3,000 times.

> Kenneth E. Boulding is one of the magisterial figures in the field of social science. He has served as president of six major scholarly societies (American Association for the Advancement of Science, American Economic Association, International Studies Association, Peace Research Society, Society for General Systems Research, and Association for the Study of the Grants Economy). . . . Boulding is currently Distinguished Professor of Economics

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Emeritus at the University of Colorado and a Research Associate and Project Director of the Program of Research on Political and Economic Change in the university's Institute of Behavioral Science.[3]

Boulding obviously deserves serious scholarly attention. His integrated "ecodynamic" social philosophy was published relatively late (1978) in his career. This philosophy is presumably of substantial educational import. The present dissertation attempts to add to our body of knowledge in the fields of education and philosophy; as knowledge and society change, new social philosophies and educational ideas should be entertained. Such new philosophies and ideas may positively influence the behavior of individuals and societies.

The present study articulates and critically analyzes the philosophy of Kenneth E. Boulding--with special reference to education and learning. The fundamental thesis advanced is that it is possible--by actually doing it in the present study--to locate, assemble, articulate, and evaluate existing criticisms of the philosophy of Kenneth Boulding and identify some education-related implications of his philosophy. No known doctoral dissertation or scholarly book has explicitly and systematically assembled, articulated, and examined critical commentaries related to Boulding's thought--with or without special reference to education and learning. Library research was the general

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methodology employed in the present study. Only selected writings (see below) by and about Boulding were investigated. As specifically identified elsewhere, a few of the materials sought for study were effectively unavailable.

The dissertation consists of five chapters (and one appendix). Chapter 1 introduces and outlines the investigation. Chapter 2 describes Boulding's general social philosophy, based on his Ecodynamics.[4] Chapter 3 presents Boulding's thoughts about learning and education, based on The Image and his Collected Papers.[5] Chapter 4 locates, assembles, and articulates existing criticisms of Boulding. (In an appendix to the work, each of the 137 discourse-units critical of Boulding is examined in turn.) Chapter 5 summarizes and evaluates the discourse-units or criticisms of Boulding which are specifically education related. Then Boulding's philosophy is rationally reconstructed for the purpose of engendering or identifying some of its education related implications. This purpose is served by asking the following leading question: "What would the structure of 'Boulding University' look like, and what is its mission for world leadership?" It is concluded that Boulding's core curriculum (required of all) would teach students

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how to learn as an ongoing lifelong process and how to think globally as a context for the advancement of moral identity. In addition, recommendations are suggested for further research.

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NOTES

1. The quotes in this section are taken from Epicurus, Bacon, Thompson, and Boulding. Regarding Epicurus, see Rex Warner, The Greek Philosophers (New York, NY: New American Library, 1958), chap. 7. Regarding Francis Bacon and D'Arcy Thompson, see Loren Eiseley, The Man Who Saw Through Time (New York, NY: Charles Scribner's Sons, 1973), chap. 4. Regarding Boulding, see note four below.

2. Cynthia Earl Kerman, Creative Tension: The Life and Thought of Kenneth Boulding (Ann Arbor, MI: University of Michigan Press, 1974). Foreword by Kenneth E. Boulding.

3. Kenneth E. Boulding, Human Betterment (Beverly Hills, CA: Sage Publications, 1985), 224.

4. Kenneth E. Boulding, Ecodynamics: A New Theory of Societal Evolution (Beverly Hills, CA: Sage Publications, 1978 and 1981).

5. Kenneth E. Boulding, The Image: Knowledge in Life and Society (Ann Arbor, MI: University of Michigan Press, 1956); Kenneth E. Boulding, Collected Papers, Volumes 1-6 (Boulder, CO: Colorado Associated University Press, 1971-85).

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CHAPTER 2

BOULDING'S PHILOSOPHY

No doubt Boulding's social philosophy is in part constructed out of the life experiences described in Kerman's biography of Boulding. On the other hand, unlike Teilhard's attempt at scientific-religous synthesis (The Phenomenon of Man), Boulding apparently considers it premature (if this is the proper word) to claim integration of his academic and religious selves.[1] Rather, his integrated social philosophy is seemingly the work of an academician interested in ideas. Yet Boulding, in his social philosophy published as the book, Ecodynamics, seeks to place his theory of societal evolution in the larger perspective of universal evolutionary patterns, as explained immediately below.

A Dynamic, Evolving Universe

The universe appears from our very limited perspective to be evolving.[2] Whether the universe in general is in fact static or dynamic, orderly or chaotic, the human mind seems to have a need for a sense of pattern, even to the superstitious point of seeing order

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when there is none. Boulding is not claiming to understand the entire universe; rather he believes that he detects certain patterns within the universal structure. Boulding does not claim to know if the universe had a beginning or whether it has always existed. But following the big bang, if there really was one, two kinds of irreversible changes seem to direct the arrow of time: entropy and evolution. Entropy may be characterized as the decay of structure with time; evolution may be characterized as the complexification of structure with time.

Evolution itself evolves. The succession of evolutionary patterns even has an evolutionary pattern. From our terrestrial perspective, there appear to be three general evolutionary patterns: physical, biological, and societal.

The universal physical process appears to be a phase pattern (as distinguished from the relative autonomy of genetic reproduction). Change produces instability, which produces new structures fitted to the new environment. For example, water differs (solid, liquid, gas) depending on environment. It seems to be the case that dynamics has sometimes resulted in evolution rather than in mere change or in stagnation. Boulding speculates as to how change may sometimes result in complexification or evolution; see the section below

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on biological evolution for further explanation of this speculation.

We can think of the physical world as four dimensional, with time special from the others. We move forward, but not backward, in time.[3] The stereo movie we call the universe runs only forward, not backward. It is our images of the past, not its reality, which change. The cosmic stereo movie is for us a gigantic jigsaw puzzle, with many missing, incorrect, and ambiguous sequences. On the other hand, if the past is a single reality, there are indeed a number of alternative futures; one of the numerous alternative futures will be realized. The past has been determined, the future has not. It is possible for the layers of trees (sequences) of the various alternative futures to converge. In such case the distant future may be less uncertain, or more certain, than the near future.

By the term "dynamics," Boulding means simply a pattern of movement.[4] Evolution, however, involves a change in the pattern (i.e., in the parameters which define the pattern). With Newton we get dynamics and a very partial explanation of our cosmic past.

If we assume the present scientific paradigm, then everything real must be based in the physical (i.e., in space-time); everything real, therefore, is based in matter or energy or matter-energy.[5] It is, then, matter

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or energy or matter-energy which evolves. It is, then, the structure of matter (or perhaps matter-energy, but remember the supposed relation between energy and entropy!) which becomes more complex over time. At the physical level this complexification is sheer structure; at the biological level it is biogenetic know-how; and at the societal level it is human learning (learned knowledge).

Sheer structure, biogenetic know-how, and learned knowledge are all forms of knowledge. It is knowledge which evolves. Knowledge is the result of an interaction, not a simple cause-effect or simulus-response, process. To a smaller or larger extent, obtaining information from a system changes the system or organism; Boulding calls this the "generalized Heisenberg principle."

Success tends to produce reinforcement rather than profound learning.[6] Yet we may learn the wrong things from failure. There are three ways to meet failure: 1) Our image of the world was incorrect; 2) We made the wrong inferences from our image; or 3) The evidence (message) was illusory (incorrect). Controlled and careful observations may not always be possible or feasible, but the scientific approach consciously attempts to guard against illusory evidence (incorrect

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messages); likewise, science attempts to be explicit in its inferences.

Although, so far, humans have tended to advance physical science to the exclusion of social science, in fact our sample of the physical universe as a whole is extremely small.[7] Our available sample of the terrestrial societal universe is relatively larger. (Our sample of the terrestrial biological universe is intermediate in size.) Accordingly, it seems fair to say that the physical sciences are soft sciences and the social sciences hard. On this basis, it seems reasonable to expect that our present knowledge of the physical universe as a whole will be overturned at some time in the future. On the other hand, our knowledge of a specific culture is less likely to be overturned.

Evolutionary potential is somehow generated in the cosmic beginning.[8] As the potential is used up, available energy decreases (entropy) and matter increases in complexity and number of structures (evolution). Phase spaces make up the physical universe; with evolution the phase spaces (their parameters) change. Physical populations (e.g., the hydrogen atom species) are not self-generating. Ecology in its properly broad view deals with, or is the science of, interacting populations (physical, biological, societal).

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A complex (i.e., improbable) structure has a history which developed it into what it now is.[9] The process by which something comes into existence (nucleation) often differs from its processes of development. A foreign object may act as a catalysis of nucleation. Nucleation is a kind of knowledge; catalysts sometimes supply the necessary information to start a reaction or developmental process which otherwise would have no place to start.

Unstable chaos became less unstable, thus creating structure or information or improbability or knowledge.[10] On the planet Earth, physical evolution developed in such a way as to allow biology and biological evolution. The dynamic process of geological evolution (plate tectonics and orogeny) is only one speck or catalyst in the totality of evolution, yet it set the stage for the nucleation of biological and societal evolution. According to Boulding's so-called "Goldilocks Principle," physical parameters have to be "just right" for biological evolution to occur. If things are "just right," then evolutionary potential may be created.

According to Boulding's so-called "Reagan's Law," all atoms of the hydrogen species are interchangable; all redwood trees, however, are not interchangable.[11] On the other hand, all redwood trees do have a common genetic structure, which is why we call them all

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redwoods. Physical species (e.g., hydrogen atoms), biological species (e.g., redwood trees), and societal species (e.g., automobiles) all interact with each other. Only humans are aware of this fact.

The number or population or stock of a species may be thought of in terms of Boulding's so-called "bathtub theorem."[12] To be sure, we can think of the water in the bathtub as a homogeneous mass which we may measure; or, we can think of the water as distinct items (molecules) which we may count. If there is neither income nor outgo of water in the bathtub, then the stock or population of the species is stationary. If there is through-put, with income and outgo approximately equal, then we have an equilibrium population or stock. Yet in an equilibrium population of (say) humans, the percentage of teenagers (a subpopulation) which make up the stock may change.

If hydrogen atoms do not age, horses, humans, and human artifacts do.[13] Unlike physical species, biological and societal species undergo developmental changes over time. In humans, for example, we may speak of three groups of cohorts: the young, the childbearing, and the old.

According to Boulding: "The equilibrium population is the most satisfactory concept of the 'niche.'"[14] The reason Boulding says this is that concepts such as place, habitat, or ecological role are too narrow if we want the

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term 'niche' to include all (not just some) ecological parameters (involving its total environment).[15] And if phenotypes or bio-organisms have niches, so do genes. In filling a niche (in Boulding's abstract, clear-headed terminology, this means the process of finding equilibrium), a population may be characterized as tending more toward one of two strategies. With r-selection comes relatively high birth and infant mortality rates; with K-selection the population has relatively low birth and infant mortality rates. Species which are territorial and have parental care of young tend to be K-selected.

At the next level of complexity, we can think not only of incomes as births and of outgoes as deaths; those who migrate into or out of the "bathtub" are also incomes or outgoes, but they may be of any age.[16] Imports, for example, are in-migrants and exports are out-migrants. Migrants may have unusual characteristics relative to populations or subpopulations which make up either the old or new "bathtub." Boulding speaks of the "founder effect": Some in-migrants changed "bathtubs"--either consciously or in effect for the purpose of founding a new population; the population may eventually mutate into a separate species. A member of a species may, for example, be born, migrate, age, and die. Social artifacts have additional dynamics as well--for example,

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they often have many "parents" rather than one or two; the fusion of a number of ideas may result in an automobile or a computer.

If we simplify matters by saying that one population affects a second population either positively (cooperation) or negatively (competition) or neither (to no effect), then we have seven different kinds of ecological interaction, as follows:[17]

1. Mutual Cooperation. This is common in nature. A "rise in population of A expands the niche for B, a rise in the population of B expands the niche for A."[18]

2. Parasitism. This is common in nature. "A is competitive with B, but B is cooperative with A."[19]

3. Predation. This is common in nature. "A is food for B, in which case the more A the more B, but the more B the fewer A. . . . The difference between parasitism and predation is mainly that in parasitism parasite A is smaller than the victim B, whereas under predation the predator A is usually larger than the victim B."[20]

4. Mutual Competition. This situation is common. "An increase in A reduces the niche of B, an increase of B reduces the niche of A."[21]

5. Dominant-Cooperative. This is common in nature. A "rise in A raises the niche of B, but . . . change in B does not affect A at all."[22]

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6. Dominant-Competitive. A "rise in A will diminish B, but a change in B will not affect A. This situation is probably rare and hard to detect."[23]

7. Mutual Independence. This is common in nature. Here "neither species affects the other. . . . It is found . . . between isolated habitats."[24] Blue whales and mountain goats would be an example. A number of isolated habitats, as distinguished from a single unified habitat, probably makes successful mutation more likely.

Until recent centuries, human cultures developed independently of each other, suggesting a cultural richness not to be found in a single world culture.[25] Perhaps the culture that happens to be technologically superior (western culture) at the unique moment of global unification will become the single world culture. Or perhaps one species, called nuclear weapons, will exterminate all of the species we call humans.

The globalization of culture may diminish variation, variety, and the rate of evolution.[26] Also "it introduces dangers of universal catastrophe rather than local catastrophe."[27] If "we develop a single world civilization and anything goes wrong, everything may go wrong."[28]

Boulding identifies three types of dynamics resulting from ecological interaction, as follows:[29]

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1. Short-Run Equilibrium. A lake has an ecological network of species which tend to keep it a lake.

2. Ecological Succession. "A lake eventually becomes a swamp and the swamp may become solid ground and be covered with forest."[30] If the ecosystem then stabilizes for a long time, it is called a climactic ecosystem with little intrinsic potential for further ecological succession.

3. Evolutionary Disequilibrium. The larger evolutionary process (genetic mutation, orogeny, etc.) may then cause ecological succession by disturbing the climactic ecosystem. In biological evolution, evolutionary disequilibrium is the most important of the three dynamic processes. Boulding reminds us again, however, that the real "world does not consist of homogeneous interacting species. It consists of individuals all of whom are in some sense different."[31] Yet some insects or plants "almost have to be regarded as a single organism," from the point of view of understanding ecological interaction.[32]

Biological Evolution as Biogenetic Know-How

Biological evolution began two billion years ago and consists of two interacting sets of processes.[33] The two interacting realms are the genosphere and the

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phenosphere: 1) The genosphere includes sperm and eggs--a proper set of genes knows-how to make both genes and bio-organisms; and, 2) The phenosphere includes all biological organisms of planet Earth.

Although, in general, biological evolution is a process of variation or mutation and of selection, Boulding distinguishes five aspects to biological evolution, as follows:[34]

1. Replication. DNA is able to use materials in it environment to make an exact three dimensional reproduction of itself.

2. Recombination. Existing genes may be rearranged, as in sexual reproduction. (Sexual reproduction means "that it would be theoretically possible to have two children of the same two parents genetically unrelated if each got a different half of the chromosomes from each parent. . . . The model also implies that . . . nobody has more than forty-six ancestors, one for each chromosome of the human genome."[35])

3. Redefinition. Genetic mutation is the "great dynamic of evolution, . . . particularly in the direction of constantly increasing the complexity of these instructions. . . . Any given genetic structure will have a repertoire of potential mutations."[36] (A different sequence of mutations might have made dolphins,

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not humans, responsible for societal evolution. Most genetic mutations, like most new emotions or ideas, do not survive. On the other hand, one of Boulding's evolutionary principles or insights is that given enough time, the highly improbable will occur; it is probable that the improbable will happen in the long run.)

4. Realization. The genotype develops into its phenotype, or realizes its potential. An organism has a life pattern from conception to death. In humans, conception produces embryo, produces fetus, produces baby, produces child, produces adult. The adult produces egg or sperm, then grows old and dies. The fertilized egg knows-how to produce an organism. The genome is both blueprint and carpenter. The genome evaluates the atoms, choosing one but not the other. (Boulding identifies five types of know-how. Sieves filter out the unwanted. Extrusion is a process used in the making of a variety of pastas. A catalyst or nucleating agent acts as a template or mold. All processes of production involve a tree of sequences or sequential behavior; biological production involves sequential differentiation. "The coordination of growth requires messages that change the state of the region they arrive at";[37] the cybernetic function provides "deviation-diminishing feedback."[38]

5. Selection. Selection "is a critical factor both in the growth of the organism from the egg and in

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its behavior. In a larger sense it is the critical factor in the whole evolutionary process."[39]

"It is only those changes that have survival value which survive. . . . survival of the fitting [not of the fittest], the fitting being what fits into a niche in an ecosystem."[40] In a given ecosystem there may or may not be niches for the strong, the weak, the selfish, the altruistic, etc., etc. "The principle of natural selection in itself tells us nothing about what will survive, or what qualities or properties give survival value."[41] On the other hand, "discovery of great redundancies in the genome suggests that these may constitute long-run reserves of genetic potential."[42]

In humans, one's knowledge or image of the world, conscious and nonconscious, coordinates one's behavior, evolution, growth.[43] There is nonlearned knowledge or instinct and there is learned knowledge in humans and other animals. For instance, the sex instinct in some mammals is very vague: Copulation must be learned. In humans, the brain is large and undifferentiated, suggesting great potential for learning. In the vast evolutionary drama of variation-selection, human decision is part of the cosmic selection process.

Because evolution means change, a species which is extremely well fitted to its niche may be less likely to survive than a species which is only moderately or

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somewhat fitted to its niche.[44] It is the meek who survive. Boulding also mentions what he calls the "principle of joint genetic production": It is not the genome, but the genome jointly with the environment, which produces the biological organism. The potential of the genome may go unrealized, or be more or less realized, depending on the environment. Given the proper environment a human baby may live rather than die, thrive rather than survive, learn rather than mislearn.

For a significant period of time in biological evolution, Australia was relatively isolated, an ecosystem to itself.[45] This evidence suggests to Boulding that a set of isolated ecosystems (as distinguished from one large system) tends to lead to more variety of biological species, but to fewer extreme variations: Evolution has some tendency to become stagnate in isolated ecosystems.

Why has not evolution in general stagnated? For one thing, given a long enough period of time, systems of order may appear and re-appear in the chaos; the highly improbable is highly likely to occur in the long run. Moreover, in the biological realm there seem to be more niches to fill at the top than at the bottom, thereby giving complexification a slight long term advantage. "Mutations that do not increase complexity, or which diminish it, have to compete with the existing

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niches."[46] Boulding here is suggesting that his notion of "the empty niche" is a significant one. For biologists it is a difficult notion, since they are unable to study what does not exist. The notion comes easier when thinking of societal evolution: Clearly there is an empty niche "for a battery that would store large quantities of electricity cheaply."[47]

Societal Evolution as Human Learning

Biogenetic know-how eventually evolved to the point of producing the first members of the human species.[48] Human learning threw evolution into yet another new gear. Although some prehumans produced artifacts--e.g., beaver dams and bird nests--it was humans who added to the earth's ecosystem new species (i.e., artifacts) whose variety eventually exceeded the number of insect species. These new human-made species not only include physical artifacts smaller than amoebas and larger than whales, but also organizations such as churches, universities, and nation-states.

Some of these human-made artifacts are not consciously produced--yet they nevertheless originate with humans (with so-called "images," conscious or nonconscious, in the human mind). In the absence of humans, they would cease to exist. The wide variety of arts and sciences and philosophies and religions would

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all become extinct. Indeed, human persons themselves are partly human-made cultural artifacts, and partly biogenetic productions. The learned (non-biogenetic) aspect of being human is produced both by others and by oneself. Others teach (whether meaning to or not), but human individuals also learn on their own. If you were raised in Liverpool, England, it is likely your parents would teach you to speak English. Yet some Anglophones also teach themselves to speak French or to engage in philosophic reflection. Houses are human-made artifacts, but so are the humans who live in houses. Houses, humans, horses, and horseless carriages are all species which interact with each other in the earth's ecosystem.

The non-Lamarckian biogenetic structure of humans permits them to acquire and develop the quasi-Lamarckian noogenetic (i.e., sociogenetic) structure of a particular culture.[49] Boulding believes that in humans learning is rarely limited by biogenetic structure (the human brain has great potential for learning); it is our patterns of learning which limit our learning. Consciously or nonconsciously, we learn patterns of learning/ mislearning. Likewise, the production of human artifacts depends on knowledge, energy, and materials--but with societal evolution the growth and further growth of human knowledge makes energy and materials less and less important as limiting factors.

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The genosphere is the realm of biogenetic know-how within the biosphere.[50] The noosphere is the realm of human know-how and knowledge within the sociosphere. In general, the dynamic processes found in the biosphere have parallels in the dynamics of the sociosphere.

The biogenetic process produces biological organisms.[51] The noogenetic process produces human artificats. (Human artifacts may be characterized as of three kinds: 1) material things; 2) societal organizations; and, 3) persons, as distingusihed from mere bio-organisms.) The human's genetic potential for learning is rarely fully realized. "Most of us paint ourselves into a tiny corner of it [the vast ballroom of the mind] because we learn not to learn."[52]

In the biosphere, a chicken comes from an egg.[53] In the sociosphere, an automobile comes from an image in the mind of human person(s). (An image may be conscious or nonconscious.) Chickens and automobiles and eggs and images all interact in the ecosystem; all are species. Production, whether of living organisms or of human artifacts, may be limited by lack of knowledge, energy, or materials. "Energy and materials are very flexible limitations, because they can both be pushed out by the growth of knowledge, though sometimes this fails to happen. It is the knowledge limitation that tends to be dominant."[54]

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Biological and societal evolution have some similar processes in common: The "four Rs and the S" also apply to societal evolution.[55] 1) Language allows replication of images and gives stability to the system. Beyond speech and writing, we now have printing and discs. "If all human beings and their artifacts were mysteriously destroyed over night in every country of the world except Australia and the destructive force disappeared, in three or four hundred years the world would be full of Australians and all the cities would be rebuilt and the world of human artifacts reestablished."[56] 2) Recombination means that many human-made artifacts are multisexual. A philosopher may borrow ideas or sets of ideas from numerous previous philosophers (not being limited to bisexuality or to becoming fixated on unisexuality). 3) In the sociosphere, redefinition means noogenetic mutation--discovery and invention. 4) If the new idea, emotion, or image is to survive and grow into realization, a niche must be available. Sometimes due to lack of creativity, an empty niche goes unfilled. For example, horses and humans both existed together in certain cultures or epochs with empty niches for horse collars and for stirrups; but only relatively recently were horse collars and stirrups invented and realized or produced. 5) Human selection of precisely which emotions, values, and ideas are to be produced or

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realized depends on the perceived payoffs (whether in terms of threat, exchange, or integration). The perception of payoffs may be conscious or nonconscious. Humans perceive payoffs or lack of payoffs or counter payoffs especially when an expectation is disappointed; they are thereby "forced" to learn. Even so, there is still no guarantee that what they learned is true: Superstitions "have a certain tendency to be found out eventually. The truth has the remarkable capacity that it cannot be found out."[57] Nevertheless, humans seem to learn values, learn to select other values, and learn to selectively coordinate values at the individual and community levels.

If there are some similarities in the biosphere and sociosphere, what are some of the differences between the biological and societal processes of evolution?[58] Boulding points out that since it is unclear precisely what we mean by the terms "complexity" or "evolution," it is not necessarily obvious if societal evolution is more complex than biological evolution--however, there are some differences between the two. It is the human brain which makes the difference.

Human brains "image" a complex, vast universe, the totality of everything. (Boulding's notion of "the image" will be described in more detail in the present study's next chapter.) The human brain contains images

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of the external world and also images of the internal--including a sense of right and wrong. There are not only images of realistic facts and of sound values, but also images of wild fantasy. The capacity for complex images allows the possibility of societal evolution. The imaging capacity of humans is presumably the property of the integrated brain rather than of a single brain cell.

Human language was perhaps the first major human artifact.[59] Human language permits communication of images and the possibility of image modification due to such communication. Human language goes beyond the prehuman language of mere one to one relation (i.e., signs). Perhaps the key to societal evolution was the ability of a human to symbolize--and therefore form complex integrated images not ever personally experienced prior to the symbolization. I have an image of China although I have never personally visited there; furthermore, I realize that my image may be inaccurate, despite the fact that I may use symbols to reproduce the complex image in others.

Human language has the ability to transfer a complex image from one person to another. A book, for example, permits transference of images from the present to the future. Language tends to bind all persons of all times together, as if one mind.

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Boulding says that a human language, a complete language (e.g., French), has the potential to communicate anything (i.e., any image in a human mind) whatsoever from one human person to another; in other words, a complete human language is easy to expand in order to meet new human needs and insights.[60] A word's "gene" is its meaning. Some words become extinct. A sentence is a community of words. The rules of grammar determine (or help determine) whether or where a niche exists for a word to occupy.

If Boulding is correct about a complete (and open-ended) language being able, potentially, to communicate almost anything relatively easily, then in general it does not matter a great deal whether we communicate in, say, French or English.[61] Rather, what ultimately is dangerous are incomplete languages used by specialists (e.g., mathematicians). Neither an incomplete language nor a closed language permits integration of the multi-faceted whole of reality. Mathematicians are unable to say "I love you"; Boulding insists that social scientists, at least, should be made aware of this. Fortunately, biologists have never taken mathematics as seriously as physicists have. Boulding also believes that the cultural conflicts within a multilingual society would continue even if the society were to become monolingual.

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If an entity is to have a conscious goal for future realization, then it must have the capacity to form images of the future.[62] Images of the future become more important in the higher animals. The first tool made by humans was not merely the result of a prior stimulus but was due to a futuristic vision.

A conscious human decision is a choice about alternative futures. Therefore, one aspect of societal evolution is the experience of the pull of the future. Although all our experiences are experiences of the past (an imperfect record of the past), we nevertheless form images of the future. For example, the first Christians thought the end of the world was at hand. As in Marxism, the futuristic image produced real consequences and an actual future different from the futuristic vision.

Humans not only form images, but they also modify their images based on internal and external messages.[63] Image modification is the process by which humans learn. An image which seems to work tends not to be modified. Learning occurs when an image is disappointed or falsified. Of course it is possible to learn the wrong things. However, the modified image may subsequently be disappointed or falsified. We tend to act on an image <u>as if</u> it were true--until such time as it is disappointed or falsified by internal or external messages. This is the human variation-selection learning process which seems to

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parallel the process of variation-selection in biological evolution.

Boulding traces three evolutionary stages of human learning: folk, literary, and scientific.[64] Folk knowledge is of the immediate world as personally experienced. Due to rapid feedback (disappointment or falsification), it tends to be accurate. We soon learn if we have taken the wrong path home. And the earth as personally experienced in 10,000 B.C.E. is indeed flat.

Literary or speculative knowledge involves fantasy or speculation beyond our personal experience. We may speculate that this rock or rabbit is a conscious entity of some sort, that that star is a powerful god, or that by simply thinking hard enough we can fly like a bird. Literary knowledge can be highly inaccurate.

Scientific knowledge builds on aspects of the other two but does not replace them.[65] Science is an organized way to test literary knowledge, to the extent fantasy may be testable at all. The evolution and expansion of human artifacts permits us to better test our fantasies on the one hand, and better realize or actualize our fantasies, on the other hand. Yet if Copernicus had had a computer, he could have easily performed the Ptolemaic calculations; perhaps he would not have viewed the Ptolemaic system so harshly, since it could be made to work. Perhaps the complexity of the

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Ptolemaic system prevented, and the simplicity of the Copernican system promoted, the complexification (evolution) of society? (Again, Boulding is suggesting that the notion of complexity is not simple.) Science is also concerned with improvement of our knowledge of the past. Science helps us test our speculations, or fantasies of meaning, both backward and forward in time.

Another difference, perhaps "the great difference," between biological and societal evolution is that prehumans expand to fill their niches whereas humans create the niches into which they expand.[66] The three great epochs of niche expansion correspond roughly to the three forms or stages of knowledge formation:

1. Pre-civilization (folk knowledge);

2. Civilization (literary knowledge), approximately 3000 B.C.E.-2000 C.E.; and,

3. Post-civilization (scientific knowledge).

Pre-civilization (folk knowledge). Unlike Homo Erectus and Homo Neanderthal, the human species (Homo Sapiens) expanded to most of the planet Earth.[67] There has been very little biogenetic change in the human species from its beginning about 75,000 years ago. On the other hand, there was relatively rapid biogenetic change among the species leading up to humans. Early humans of hunters-gatherers lived in small bands of perhaps a few dozen individuals at most; noogenetic

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change (mutation of the fundamental structure of a specific culture, society, or subculture) was very slow. Learning among them was slight--yet biogenetically they were our equals. With the coming of agriculture, more people could inhabit the same area, and they could live longer average lifespans (say, 40 years of age instead of 30). Agriculture existed in 10,000 B.C.E. and by 5000 B.C.E. there were many agricultural peoples. The hunters-gatherers were pushed aside.

Civilization (literary or speculative knowledge). With civilization (the rise of cities--say, about 3000 B.C.E.) came a further, but slow, expansion of human population and its niche.[68] Agriculture, combined with armies, established storage of surplus food and produced cities and empires. The leisured elite thereby established slavery and citizenship, partaking of the surplused food, and engaging in the expansion of folk knowledge (including technology), and literary (speculative) knowledge. Now noogenetic change is indeed underway. By 1900 C.E., science has become a vital, organized effort; we likewise find the beginnings of science-based (not folk-based) technology.

Post-civilization (scientific knowledge). Just as 5000 B.C.E. agriculture proved to be a major impetus to 3000 B.C.E. civilization, so 1860 C.E. science is proving to be a major impetus to 2000 C.E. post-civilization.[69]

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Post-civilization, whatever precisely it may prove to be, is yet another niche expander: With the development of organized science and science-based technology, technology (not persons) can provide optimum food production, whatever that optimum may be.

Yet another difference between biological and societal evolution is the kinds of relationships which motivate human learning: threat-relationships, exchange-relationships, and integrative-relationships.[70] (There is no meaningful analogy to this in the biological domain.) It has already been suggested that, except for threat-relationships, we might still be living in a state of pre-civilization. Prehuman societal relationships (compared with the variety of human organizations) were almost nonexistent; families and tribes, in some general sense of the terms, were about as far as prehuman primates came to organizational structure and the possibility of societal evolution. Moreover, it should be pointed out that an ecosystem is <u>not</u> a community; mere ecosystem interactions do not involve societal organizational relationships. A biological organism is a kind of organization, but organization between two nonhuman organisms is rare.

Boulding also emphasizes that societal organizations differ from biological organisms even when we can find similarities. A wolf does not threaten to

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turn its victim into a slave or a citizen--it simply catches the victim to alleviate its immediate hunger. Trees provide shelter, not consciously seek exchange. Two symbiotic species are not in a loving-integrative relationship with each other. Therefore, the three kinds of human learning relationships differ from the dynamics found in the biosphere. By threat, exchange, and integrative relationships, humans learn their roles in society.

And yet another difference between biological and societal dynamics is as follows: Contrary to the popular image, conflict or struggle among nonhuman animals is rare. Yet in the human world there does seem to be struggle and conflict. For example, war and revolution have been known to occur among humans. On the other hand, according to Boulding, many history books overestimate the importance of war--it is more dramatic than non-war.

If we are not realistic, then our actions will not produce the desired results. False images and mislearning may mislead us into catastrophe, perhaps even extinction of the entire human species. It is perhaps easier to hold images without testing them than it is to test our images and find them false. Yet if we want to alleviate misery, prevent catastrophe, and promote human betterment, then, according to Boulding, realistic

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understanding of societal processes should receive top priority.

Threat as a Motivator of Learning

Threat says: You do something I want or I will do something you do not want.[71] This is one kind of way we learn our role in an organization (i.e., in a relationship). It requires decision; because it requires decision rather than mere automatic reaction, it is a learning (or mislearning) situation instead of an instinctual response to a stimulus. Without threat (e.g., soldiers), pre-civilization (75,000 B.C.E.-3000 B.C.E.) might never have evolved into civilization (3000 B.C.E.--2000 C.E.), which is perhaps the condition for the possibility of post-civilization (beyond 2000 C.E.). War and taxes, characteristics of civilization, are based on threat.

In the face of threat, four alternative futures may be entertained: submission, defiance, counterthreat, or flight. Due to habit, or because one alternative is so obviously superior, we may not always be conscious that a choice is being made.

Submission

Slavery, the master-slave relationship, is a permanent or long-term system of submission. Every legal system is a kind of slavery. For slavery or long-term

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threat to work, it must be legitimated. Threats perceived as legitimate are more effective than mere threats. A person who believes taxes are legitimate is more likely to submit to taxation. Even those who accept taxation as legitimate would pay far fewer taxes if it were purely voluntary. It seems that both threat and submission to threat are sometimes necessary. Learning what is necessary or realistic is of great value. This is not the same as saying that slavery or threat or submission is always right or good. Democracy is a way of legitimating government.

Defiance

If one submits, one does what the threatener (e.g., the I.R.S.) wants. But if, instead, one says "Go jump in the lake," the meaning is less clear. There are 16 logically possible states of defiance. However, if we ignore what each side thinks the other side actually believes, we can condense the 16 alternatives to four: A) Challenge: The threatened party defies the threatener even though both parties believe the threat will be carried out; B) Bluff: The threatener does not believe the threat will be carried out (i.e., does not intend to carry out the threat), but the threatened party believes the threat will be carried out; C) Boast: Neither party believes the threat will be carried out; defiance here is more likely than in the previous two cases; and, D)

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Feint: The threatener believes the threat will be carried out, but the threatened party does not believe the threat will be carried out; this situation is more likely to result in the threat being carried out than in the other three cases.

Our behavior, however, is based on our perception of what is the case. In the course of living and learning, of decisions made by self and others, our perception of reality changes. The threatening party, according to Boulding, perceives itself as attempting to make things better (for self, family, country, world . . .).

Defiance tends toward counterthreat; therefore, there is a tendency for a threatener to want others to believe the threat can be carried out. This goes a long way to explain the evolution of weapons. Because both weapons and the carrying out of threats can be expensive, bluffs have an important role to play in human relations. Whether a bluff will work depends in part on whether the threat is legitimate. In religion, for example, the threat of Hell may come to be perceived as a bluff.

Counterthreat

A counterthreat to a threat tends to make the situation more symmetrical, stable, or deterring. On the other hand, the longer deterrence lasts, the more likely it is to result in threats being carried out. If this

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were not so, then the counterthreat would have no deterring force. History shows this logic to be correct: over the long term, deterrence tends to break down into war. Nuclear deterrence is of course not exempt from this tendency. It seems likely that sometime in or near the 21st century either there will be a nuclear holocaust or we will establish a viable world organization for the policing of disarmament.

Flight

The flight of the Pilgrims to America and the exodus of the ancient Israelites from Egypt are two successful examples of this choice under threat. (The flight of Native Americans into the west was unsuccessful.) The further an army is from base, the less ability it has to carry out threats. The Americans found it easier than the Irish to defy the threats of the British. The Americans considered the externally imposed taxation to be illegitimate; yet the Americans were to establish their own threat system, including taxation and Indian reservations.

In history there seems to be a tendency for the spiritual threat of priests to be superseded by the physical threat of kings. The shell of the turtle provides defense. The teeth of a tiger provides offense. And then there is the moderation of a

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porcupine. There are varieties of threat and varieties of response to threat; war is not necessarily inevitable.

The modern missile can travel to any point on the globe. A castle's walls or a country's borders are less secure now than ever before. The way to overcome a stronger defense is to build a better offense.

Threat, war, and territoriality in humans is primarily learned, rather than biogenetic.[72] Human biogenetics leaves much of the human brain highly malleable, open to learning. There are historical reasons of societal dynamics as to why civilization selected males to be soldiers. Our previous account of human evolution from pre-civilization to civilization to post-civilization is suggestive.

Prior to post-civilization (the 21st century and beyond), pregnancy, childbirth, and childraising were viewed as primarily roles for females, if we may be permitted to generalize. This was in part due to the fact that prior to (approximately) the 21st century the only way of producing a human--whether male or female--was by the human female acting as an incubator or means of production for development of a human from conception to birth.

The biogenetic difference between human males and females is greater than the biogenetic differences among the subspecies of Homo Sapiens. Other than, as a

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generalization, the greater muscular strength of males, the previously noted social dynamics (which includes specialization of labor) probably explains why threats from females tend to be verbal, rather than physical, in the civilization stage of societal evolution. It is a common cultural inheritance, not instinct, that differentiates or forms the large malleable portion of the human brain, male and female. Due to childhood experiences, humans mislearn a great deal, calling this mislearning biology. In childhood we mislearn how to learn. This does not mean that biogenetics is an insignificant factor.

In humans, even earlier, threats have been used to create and maintain dominance over others, e.g., children should be submissive to their parents.[73] Yet there is a tremendous difference in non-use of threat and types of threat used depending on one's culture or subculture. A culture of child abuse or child murder tends to reproduce itself. Likewise, a culture of child support or child love tends to reproduce itself. Likewise, soldiers tend to use threat within their own culture of armed force for the purpose of teaching discipline.

Caning was long used in education until recently. In educational evaluation today, threat is administered, for example, by awarding low grades; the threatener and the threatened party may or may not feel such threat to

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be legitimate. Internal discipline may also be maintained in organizations by lack of promotion or by dismissal ("firing").

At this junction--the close of the civilization epoch of societal evolution, with its reliance on threat (e.g., war, taxes, specialization of labor) to teach roles--how shall we evaluate threat as a motivator of learning?[74] If threat was necessary to civilization, and if civilization is the condition for the possibility of postcivilzation, then we can only conclude that threat, with all its pathologies, was necessary in the past. If the social dynamics of civilized threat eventually produced postcivilization, then one may entertain the idea that threat was necessary for societal evolution even if it largely taught individual persons not to learn.

If civilization meant curtailing learning of individuals to promote the long term good of all, then the good of all in a postcivilized context may mean each individual learning how to learn substantially free of fear and threat. Threat at the societal or world level tends to lead to an arms race, and at the individual level to mislearning and lack of learning. Once our globe reaches the nuclear threshold, then postcivilized learning--motivated by integrative, or exchange and integrative, relationships--seems necessary to largely

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replace fear and threat. Civilization, built on threat and specialization, will either destroy all human culture or metamorphose into postcivilization. The roles taught by civilization are those of partial human beings or fragmented persons, but postcivilization requires that we learn the role of always learning to be a whole person, always in quest of integrated living and learning.

Civilization has produced great misery--but also the possibility of postcivilization. The civilized military establishments of all countries have a commonality or symbiosis in that they all are in competition with the welfare of the people. Boulding asks: Do we seek the symbiosis of an arms race or the welfare of the people? Boulding's answer is that the civilized world will either destroy itself or metamorphose into a disarmed world (postcivilization).

Exchange as a Motivator of Learning

If threat is sometimes a motivator of learning and sometimes a motivator of mislearning, what other motivators of learning/mislearning, or organizers of behavior, are there?[75] Instead of "threat learning" the master-slave relationship, why not invite someone to learn? To wit: You do something I want and I will do something you want. Buying a TV set and getting married

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are, respectively, examples of "exchange learning" to be a consumer and a spouse.

Under threat we tend to learn a master-slave relationship of win-lose necessity.[76] In exchange we tend to learn a you-me relationship of win-win proto-equality. I valued Smith's TV set more than the $100 bill I used to buy it with; Smith valued my $100 bill more than the TV set. Contrary to Marx, we both win. Although we can talk as if the TV set were objectively worth $100, in fact its worth is subjective: Some want and buy the TV set while others do not. If Smith has many TV sets and I have none, then perhaps Smith and I will decide on an exchange which we will experience as win-win. To be win-win, either party would have had to have the power of veto. Exchange bargaining, then, takes place under conditions of the threat of unilateral veto.

The invention of money greatly facilitated exchange beyond the limitations of barter.[77] Exchange, in turn, fostered division of labor (i.e., specialization) and increased productivity. Exchange organizations proliferated. Some of these organizations substantially widened their markets, becoming international in scope, specializing in products to be bought by perhaps only one person in a thousand. The civilization epoch of societal evolution, 3000 B.C.E.-2000 C.E., expanded both threat and exchange in the world. Civilization gave us product

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specialization, division of labor, fragmentation of knowledge, psychosocial alienation, and a scientific knowledge base for exponential technology increase; civilization seems to have been efficient at producing the conditions for the possibility of postcivilized living and learning in the 21st or 22nd century. (These conditions involve the exponential increase of scientific knowledge and technology.) We will either overcome the traps of civilization or we will not: We will either learn to become postcivilized or we will mislearn and become extinct.

Exchange has introduced new products and organizations into the environment.[78] In this radically transformed environment, societal species such as various human-made products and organizations interact with biological species. Such societal species are as natural as biological species; the societal domain and the biological domain interact in a complex evolutionary ecology. Most of us who live in the developed (i.e., proto-postcivilized) world live better than the most powerful king of 2000 B.C.E.--yet, as we have said, the exchange relationship also has many pathologies; this includes psychosocial alienation, maldistribution of goods, and unemployment.

Human-made products undergo mutation or modification, and extinction, just like biological

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species do. Death occurs when the product is consumed. On the other hand, unlike human-made products, biological species are often not thought of in terms of price or profit, so as to be consumed. We can think of a commodity as something we consume; however we can also think of a commodity as something we use, with consumption being a greater or lesser byproduct, depending on the commodity's durability.

The traditional "trinity" in economics is "land, labor, and capital" because we can think of them as forms of exchange.[79] Traditional economists including Marx, failed to realize that these three units are not very useful in explaining the means of production. Land is an important, perhaps limiting, factor: Physical production occurs only in actual space (land).

Buying someone's labor at x dollars per hour is not entirely different from buying/renting a parcel of land.[80] Yet there are differences. If an agreement is reached as to the amount of wages to be paid--the perspectives of the employer and the laborer may nevertheless radically differ. The laborer is not just selling or renting a commodity--but is forfeiting time. The laborer is making a decision as to the alternative use of time. The laborer forfeits time--but it is a concrete resource or product (not time) which the employer receives in return. The laborer would have used

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the time differently if no compensation had been promised. What the employer seeks is low-priced resources.

Agreeing to exchange may in some immediate sense be termed a win-win situation.[81] On the other hand, there is no guarantee that the "invisible" dynamics of the general system will insure fairness. One way to help insure fairness is (allowing) separation of management control of physical capital from its ownership. Only humans are motivated by financial profit and the will to power. The dynamics of exchange tends to lead to other pathologies as well. Unemployment and inflation are two serious challenges for a market economy.

Integration as a Motivator of Learning

Many human relationships involve threat or exchange or both as dominant elements.[82] But, according to Boulding, all actual human relationships involve a mixture of three (not two) motives: threat, exchange, and integration.

The motivation of integration is more difficult to articulate than threat or exchange. The threat pattern (of relationship, interaction, and learning) is exemplified by governments, soldiers, and laws. Business firms we identify with exchange. Churches, families, and

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friends serve integrative functions. Labor unions may be strongly motivated in all three ways.

Perhaps the integrative relationship or integral function primarily has to do with identity, a person's image of both self and others.[83] For example, you visualize yourself interacting in a multiplicity of different roles in different groups/relationships. An integrative relationship exists when two persons identify with the same group. The family is probably the strongest integral relationship. Negative identities also exist: I/we are not members of group X. Radicals, perhaps, tend to the "negative" perspective.

If we identify positively with a group, we tend to feel benevolent toward the group.[84] If we identify negatively with a group, we tend to feel malevolent toward the group. Selfishness falls between benevolence and malevolence.

Every choice involves a choice among alternative futures; we decide what we think best. One alternative future favors group X, another does not. We may decide to use threat or invite exchange to achieve the future we think best. We may consider this threat legitimate, another not. The integrative relationship, then, modifies our other relationships of threat and exchange. Threat thinking says: You do something I want or I will do something you do not want.[85] Exchange thinking says:

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You do something I want and I will do something you want.[86] Integrative thinking says: I will do something, or ask you to do something, because of what I am and because of what you are.[87]

With benevolence, we bestow positive grants (e.g., gifts) and feel pity.[88] Paradoxically, the giver feels better, not poorer. Paradoxically, the pitied party may feel worse, of lower status, not richer. To confuse things even more, gifts (so-called) may be used in a threat (or mixed motive) relationship. However, if we can successfully identify positive grants in a society, we may have a key to determining the form and extent of that society's integrative relationships.

With malevolence we bestow negative grants (e.g., property damage) and feel envy. Weapons are instruments closely identified with negative grants. On the other hand, most theft involves selfishness, not malevolence. If we perceive malevolence as win-lose or even lose-lose, and benevolence as win-win, then it seems benevolence has more evolutionary potential than malevolence. On the other hand, benevolent motives are not enough to insure betterment; we must act based on a realistic understanding of the dynamics of society. Without such knowledge, we may all act out of benevolence while these very acts cause our society or planet to go from bad to worse to . . .

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Many have died for their country; few have died for their social class, despite Marx's injunction.[89] When a factory closes, it tends to hurt not one class, but all classes, management and workers alike. People often have the same economic or other interests even though they belong to different classes. Often our ignorance of the confusing actual dynamics of society results in helping those we intend to hurt, and vice-versa; Boulding calls this the "law of political irony." Also it is difficult to identify intentions and interests. Usually we operate using simple and clear models when actuality is often complex and ambiguous. It is not possible to do only one thing--and, anyway, results often differ from expectations. This helps explain why class conflict is not as great as the clear-headed Marxists would expect. Revolutions, more often, involve conflicts within the upper class, not capitalist or worker unity. On the other hand, there are times when social class and individual interests may coincide, as when a few rich own all the land.

Internal legitimacy is when you feel okay about your own feelings and behavior, rather than feeling alienated from them.[90] External legitimacy is when others feel okay about, say, a person or organization. Giving legitimacy to a particular social role tends to establish hierarchy in the relationship. For this

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reason, the dynamics of legitimacy/illegitimacy tend to be the dominate element of society. Either individual alienation or general disbelief in a society's hierarchy will tend to lead to lose of morale and collapse of society.

By using symbols, humans communicate, transcending solipsistic experience.[91] On the other hand, an abstraction requires experience for its initial existence. Integrative learning depends heavily on emotive symbols (e.g., a country's flag). The emotion and the emotive symbol reinforce each other. It may be said that a religion is an unusually poetic image of the universe; it is a model very difficult to test out in reality.

Boulding says that the dynamics of integrative learning are unclear.[92] Most new ideas and emotions, however, like most biological mutations, do not survive. But some new emotions or ideas are fit for some habitats; the new ideas or emotions selected are perceived as enhancing a persons's or a people's identity.

Most limits to human learning are not biogenetic.[93] Rather, consciously or nonconsciously, we learn, mislearn, or fail-to-learn the proper how-to-learn and integrative patterns. The two keys to integrative evolution are the process of individual lifelong learning and the process by which a society transmits its culture

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to its children. The transmission of culture (acculturation and socialization) begins with the family. Orphans tend to receive little adult attention and therefore are often deficient in integrative learning. Small children only know the culture of their family, thereby learning language, values, and symbols. Values may be learned from the family's "hidden curriculum." If a parent shows love toward a child, the child tends to value the parent and the parent's values. Falling in love is a "benevolence race" until an equilibrium is reached. "Malevolence races" also occur. Usually an equilibrium--benevolent or malevolent--is reached at a rather low level. High levels tend to require a great deal of close interaction. How to expand our limits to love and to growth are important questions for societal evolution. Also of great importance is the whole issue of "malevolence races." And we cannot rely solely on "benevolence races" to solve all problems. We need a child rearing movement aimed specifically at developing a sense of benevolence and obligation.

The "invisible" dynamics of society often lead to pathology and malevolence.[94] Yet it seems that in the long run benevolence tends to win simply because it is more evolutionarily fruitful. Some working hypotheses are more fruitful than others. Cooperative, long-sighted behavior has greater potential for good than dead-end

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uncooperative short-sighted behavior. So, on the one hand, integrative learning has tremendous long term potential--yet this mere potential does not guarantee we will not come to a dead end. Threat learning suggests hierarchy; integrative learning favors equality. Integrative learning, then, tends to have an affinity for democracies, elections, self-determination, welfare states, and decentralization or local autonomy. Threat or exchange or integrative learning and behavior all have good and bad potential depending on a given concrete situation. But on the whole and in the long run it is the development of integrative relationships which holds the greatest potential for human learning and evolution. In 3000 B.C.E., threat learning had great evolutionary potential; in 2000 C.E., integrative learning has great evolutionary potential. Boulding, as of 2000 C.E., then, favors community over alienation--since, at this evolutionary threshold, it seems not only practical but even necessary to prevent world catastrophe.

Legitimacy tends to play a central role in societal dynamics.[95] Without payoffs of some kind (say, life or perceived quality of life), legitimacy fades. War and empire have less legitimacy in the last decade of the 20th century than in the century's first decade, for example. The perceived payoffs have faded. Nevertheless, we sometimes tend to legitimize what we

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perceive cannot be changed. In addition to the sour grapes trap there is also the sacrifice trap, when our very identity is tied up with sacrifices already made, thereby demanding further sacrifices.

Yet an institution may apparently be at its height of legitimacy today, only to collapse tomorrow. On the other hand, sheer habit is a strong force for legitimacy. But in the long run habit tends to lead to inflexibility and disaster.

Advertising and public relations, of course, recognize the importance of legitimacy. Expertise and mystification also tend to create a sense of legitimacy. But the mysteries of religion, politics, and academia may be found out! A time of lost legitimacies is a dangerous period; people will seek legitimacies wherever they can. Hitler replaces the Kaiser.

Learning and truth, hopefully, will not be divorced from our search for legitimacy and meaning. Boulding points out that we do not, at least yet, seem to have much of a theory of integrative learning. Yet development of such a theory should help us realize a better future.

The Three Phyla of Societal Productions[96]

Boulding's ecodynamic theory of societal evolution perceives human history as a complex affair whose

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explanation apparently is not reducible to a single simple principle. The key to understanding human history is not simple cause-effect, but dynamic interaction. What exactly is it that the interactions of human history produce? Human culture has produced 1) material artifacts (such as arrows and automobiles); 2) social organizations (such as churches and armies); and, 3) human persons, to the extent that being a human person is learned (rather than biogenetic). All three kinds of societal productions interact with each other. Additionally, the societal domain and the biological domain interact.

The key to understanding societal organizational structure is the notion of "role." It is not persons, but partial persons, which make up an organization. When a (partial) person leaves, the role is replaced with someone else. Persons tend to learn their roles and behave accordingly. However, there is great potential here for a person to feel fragmented, alienated, or incomplete.

Was the family the first societal organization in human history? Although we can think of a family as a type of organization (with roles), it is also possible to think of a family as made up of persons (rather than of partial persons or roles). In such case, the tribe, not the family, would be the first organization in human

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history; bands of hunters-gatherers have roles in terms of, say, specialization of labor. Beyond this, a stressful situation would tend to create hierarchy, another important aspect of the evolution of human organizational structures.

With the development of agriculture, one finds human settlements, entailing an increase in both disputes and cooperation. Accordingly, political and legal organizations emerged. Specialization of labor and hierarchy develop further. Prior to approximately the twentieth or twenty-first century, only human females could produce (biological) humans. This also meant specialization of labor and hierarchy. Humans are not only born male or female, but they also are born as infants and only after a period of years develop into adults or mature humans. Age differentials, and the need to "raise" children from infancy to maturity, further creates specialization and hierarchy. Accordingly, there has been a human history of dominance of males over females and of females over children, with a male adult as leader. And with agriculture, society becomes more dependent on the (male) farmers, rather than on (male) hunters and (female) gatherers.

Yet another key to understanding human organizational structures is what Boulding calls "allometry." Every structure has a size optimal to it.

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According to Boulding's "Goldilocks principle," a structure will not function well if it is too large or too small, rather than being "just right." In many kinds of organizations, one person can effectively communicate with only about ten others. Accordingly, there will tend to be two levels of hierarchy in an organization of 100 persons. Cities and large armies depend on hierarchy to be effective. The interaction of human-made material artifacts and of human-made organizational artifacts, rather than one or the other, were involved in cultural evolution.

Human persons who learn are the third great phyla of societal productions. Stresses, such as population explosions, can have great influence on cultural evolution, as can playfulness and curiosity. But it is the learning process and the level and dynamics of human knowledge which is the most important factor in the long run.

As we learn to produce more and more knowledge, we would do well to understand more about the knowledge industry itself, including the dynamics of alternative societal structures for knowledge production. All knowledge explosions are not alike. A longer and easier life gives one more chance to learn; yet there are many alternative ways a society may structure learning. In the civilizational epoch (3000 B.C.E.-2000 C.E.) human

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learning, human-made material artifacts, and human-made organizational inventions all interacted and continued to interact so as to produce and to continue to produce "deviation-amplifying positive feedback."

Boulding believes that his theory suggests that historians sometimes overestimate the significance of individual military or scientific leaders when viewed in the long run of societal history. On the other hand, sometimes individuals do indeed uniquely change the very parameters of the system and therefore the general course of evolution itself. For example, those who invent new approaches in religion or philosophy are involved with symbols; symbols are intimately involved in learning what it means to be "human." Viewed in hindsight, much of the history of science--unlike religion and philosophy--apparently follows a pattern.

The Means of Production

Actively learning human persons, human-made material artifacts (such as books and computers), and human-made organizational inventions (such as universities), the three phyla of societal productions, permit the transmission and increase of knowledge.[97] The school is a human-made organizational invention which revolutionized learning in that the transmission of knowledge was no longer limited to one-on-one parent-to-

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child. A single teacher can transmit knowledge to many students at once. Knowledge possessed by only a few is precarious simply because something may happen to the elite few, as happened with the civilization of the Mayans.

The process of production, whether in the biological sphere or in the societal domain, may be characterized as 1) knowledge using 2) energy to restructure 3) materials into improbable forms.[98] This is clearly the case in the biological reproduction of bio-organisms--knowledge here consisting of biogenetic know-how. This is also clearly the case in the societal production of (human-made) material artifacts (arrows or automobiles)--here knowledge may be characterized as an "image" held by a person or organization. However, in the societal production of organizations and of (the non-biological or learned aspects of) persons (learning to be human), energy and materials play a relatively minor role compared with knowledge. Human persons, in order to form organizations and in order to learn to be human, require their material bodies and the food or energy to locomote them. Organizations often require sources of energy and materials beyond human bodies. Organizations may own their own material artifacts (requiring energy), such as a building in which to meet or company-owned automobiles

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or access to airplane travel. As organizations evolved, persons learned to specialize.

Most human organizations are structured by their threat, exchange, and integrative relationships--that is, by all three (rather than by only one or two).[99] Someone may be deemed irresponsible (in terms of "exchange") and be expelled (carrying out "threat") from the community (loosing "integration"). Moreover, the three elements usually result in complex compounds rather than in simple mixtures. There is no "magic formula"--every situation is unique. However, in each case, the optimum compound almost always requires the presence of all three elements. Without threat, for example, most of us would pay drastically lower taxes or no taxes. On the other hand, most of us feel that self, or society generally, is benefited by the government's use of our taxes. Most of us also feel some identity ("patriotism") with our government. Yet if all tax dodgers and all tax fudgers were given the death penalty, this integrative element in our society might break down.

The environment in which threat, exchange, and integrative relationships are learned, is an environment filled with human-made material artifacts, organizations, and persons. A particular human-made material artifact, organization, or person may be evaluated as good or bad in terms of a particular relationship or in terms of the

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system generally. The motivating relationships of 1) threat, 2) exchange, and 3) integration--the societal productions of 4) things, 5) organizations, and 6) people--and, the means of production, 7) knowledge, 8) energy, and 9) materials--all together interact so as to produce societal evolution (human history).

Next Boulding suggests that we attempt to make sense of these nine elements as they ecodynamically interact in the tangled web of societal evolution.[100] (This is the subject of the reminder of the present dissertation's chapter two.) As we look at human history, some processes and changes appear to be more important than others. For example, the agricultural revolution and large military forces have been important in the past.

Knowledge is the most important element in evolution, for, according to Boulding, it is knowledge which evolves. Knowledge at the biological level is biogenetic know-how (one bio-organism knows how to make another one). Knowledge at the societal level is human learning (knowledge of what it means to be "human" as distinguished from "biological"). Knowledge is "the only thing that is not conserved."[101] Yet there is a qualitative difference between biogenetic know-how and human learning. "Knowledge does not know anything; only persons know anything."[102] Persons--subject to the

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limitations of energy, materials, and lack of knowledge--transform knowledge into material artifacts, organizational structures, and nonferal persons. As knowledge increases, energy and materials become less limiting "although there may be an ultimate limit to this process."[103] One can look back at history to discover points at which material or energy limitations were overcome or transformed--such as the agricultural and industrial revolutions. We tend to find new sources of energy and materials as our knowledge increases. We produced metals and, later, engines made of metal.

As we look back in history we can identify transformations in communication and transport. We have produced wheels, ships, telephones, and computers. We seem to be evolving from isolated tribes, into some kind of global village. Over time, new symbols, religions, patriotisms, and philosophies have developed, as have the communication-transport technologies. Symbolic systems involve issues such as identity, legitimacy, and sacredness; it is not easy to detect patterns or principles which will help us understand the historical development of symbolic systems.

Redistributions of power (such as wealth) are of obvious importance in history. Deflation and inflation play significant roles in a society's evolution and

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insure societal changes. Inflation helps the active profit-makers; deflation helps the passive bondholders.

Knowledge of how to increase knowledge may increase knowledge, and it may also effectively increase energy and materials. Knowledge, energy, and materials are the means of production. In societal evolution, knowledge channels energy so as to transform materials into human-made things, organizations, and people. Organizations and persons are motivated to use, modify, or increase knowledge based on relationships of threat, exchange, and integration.

Power, Peace, and Conflict

Some behavior of many animals is not merely a simple response to a stimulus.[104] There is an image of the future and a decision to be made. But human persons can think of the far future and of many alternative futures. Humans are involved in complex learning or decision-making or evaluational processes.

We observe that our behavior (based on an expectation or decision) changes our environment. We realize that we have power. If I can greatly change the future, I have great power; if I can bearly change the future, then I bearly have power. But what is deemed to be a greater or lesser change is a matter of valuation. My values may differ from yours. Moreover, we can only

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observe what happened, not what did not happen. Yet we can imagine and we can place value on what is imagined--what might have been or what just may yet be.

Freedom implies that there are at least two alternative futures.[105] A rich person has more alternative futures than a poor person. Moreover, the behavior of others may limit or expand my alternative futures. Most decisions of most persons influence their own future, but not very much the future of societal evolution. Often it is a powerful role, not a powerful person, which makes a powerful decision, a practical decision often perceived as lacking in alternatives.

In the long run, reality has a way of breaking in, showing up our illusions or superstitions. Truth outlives untruth. On the other hand, in the societal domain, there is such a thing as the self-fulfilling prophecy. Belief that there will be a gas shortage may turn out to be the cause of a gas shortage which otherwise would not have been. Such self-justified beliefs tend to be short run matters, however, with little influence on long run evolution, Boulding says.

The various niches of an ecosystem select which mutations/variations will survive.[106] (A human mind is one such ecosystem with niches.) In biological and societal evolution, many mutations/variations occur but few survive. This suggests that limits to evolution are

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more likely to be set by selection than by mutation/variation. Societal mutations/variations include decisions, wars, inventions, and discoveries; the survival of such mutations/variations depends on the niches--therefore, Boulding concludes, selection by niches is more important for the long course evolution of society than is mutation/variation. In Boulding's words: "Power changes names, but it does not change patterns."[107]

Yet mutations/variations may sometimes transform the patterns of power. Some decisions may prevent an evolutionary threshold from being reached--or, being reached, determine one niche or ecosystem pattern rather than another. Sometimes we fail to create a potential, or we destroy a potential from being realized.

Without Hitler, Nazi-like things would still have occurred--yet the history of the twentieth century would have been substantially different. "There are 'threshold phenomena,'" according to Boulding, "which can be perceived when they do happen, but we never know how close they came to happening when they do not happen."[108] Historians are obsessed with the historical record--but to <u>understand</u> the record of history we must also concern ourselves with what did <u>not</u> occur, a different enterprise.

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Power and decision-making are dramatic. Power is important to the king and to the subjects of a particular locality. Indeed, we each live in a particular locality. Yet we may overestimate the importance of visible or explicit power and specific kings to the overall longterm evolution of society.

One kind of power is status or legitimacy.[109] Another is riches or wealth. A third is violence or force. We might call these integrative power, exchange power, and threat power. Threat (the master-slave relationship) is probably the least powerful of the three, yet, when allied with integrative power, it can be extremely effective. A specific threat is more effective than a generalized threat, and a threat that is being held in reserve is more effective than one which has been carried out.

Gandhi, Martin Luther King, Gene Sharp, and Richard B. Gregg have advocated the use of nonviolent threat to achieve important political ends. Perhaps organized nonviolence is one of the most important societal mutations/variations of the present century. One form of nonviolence is passive defiance; when well organized and aimed at undermining the other's internal legitimacy, it can be effective; and when one's legitimacy is being questioned, one may react violently.

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One aspect of exchange power is economic. Economic power is control over societal productions. One major aspect of economic power is control of the means of production, which are knowledge, energy, and materials. (These are often referred to by Boulding as the three "factors" of production.) Because the poor lack knowledge (this includes lack of access to knowledge: for example, lack of capital), they often lack energy and materials. The rich have knowledge (this includes access to knowledge: for example, capital), and access to energy and materials. The rich rely on scientific knowledge, the poor on folk-literary knowledge.

We can think in terms of the amount of time a person or society spends (or not) in producing economic goods. Of such economic or "productive" activity, we can divide it into production for either exchange or domestic use. Note however that a society's effective level of knowledge has a great deal to do with whether one hour of production yields 1 unit or 1,000 units, rather than whether employment is at a 90% or a 95% level, or whether the standard work week consists of 30 or of 50 hours.

When "Society A" rapidly (say, based on scientific rather than on folk-literary knowledge) increases its production and continues to do so over a long period of time--such a society finds itself rich compared with "Society B" who is only now just beginning to rapidly

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increase its production. But, beyond this, the exponential logic of the above suggests--even if the poor eventually get richer--that the economic gap between "Society A" and "Society B" widens rather than closes. Furthermore, the logic above also tends to apply to families, not just to nation-states. The rich tend to be educated rather than uneducated, and to have wealth rather than income. Consciously or nonconsciously, the rich have found that it is knowledge (education and capital), not labor, which "counts" in their long term success.

Hitler and many of the Japanese military leaders had an imperfect knowledge of reality. Yet, in each case, the society as a whole had a strong knowledge base. Defeat of Hitler in World War II did not affect Germany's knowledge base except to improve it by deleting Hitler. After World War II, Germany and Japan rose quickly from their ashes--because their knowledge bases were intact, even improved. Their productive powers were rapidly resumed.

In addition to 1) "productive power" (see above), we can distinguish three additional kinds of economic power: 2) "allocational efficiency"; 3) "monopoly power"; and, 4) "grants." Allocational efficiency is perhaps of only rather minor significance. Withdrawal from the economic world or excessive protectionism is

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economically a bad idea. Therefore we have to at least be aware of the fact that a society may be said to allocate production of goods to either domestic or foreign exchange use, although what the most efficient allocation may be is not obvious to Boulding.

Monopoly power gives them control over the terms of the trade. Ultimately monopolies depend on no one else producing the same commodity they do. A cartel is one especially fragile form of monopoly. Perhaps monopolies generally and in the long run are fragile. The societal ecosystem changes, and this includes changes in knowledge and technology; the terms of the trade inevitably change. Organizations like the AAUP and the AFL-CIO, and organized activities like consumer boycotts, are not unlike monopolies. Monopoly power tends to be associated not only with economic power but with threat power as well. A state supported monopoly is the most secure one; the state supplies the power of legitimated threat. Nevertheless it is possible for such a monopoly to collapse even before the state withdraws its support.

Grants are a fourth kind of economic power. There are many different kinds of one-way transfers. One kind of grant (say, taxes or theft) is primarily based on threat. Another (say, gifts) may be based on an integrative relationship.

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One of the more important kinds of integrative power (i.e., power other than threat or exchange) is the power of roles.[110] A role--as distinguished from the specific person who happens to be playing the role at the moment--is more powerful if it has been legitimated. Via repetition one learns a habit which comes to seem a matter of course. If, from habit or otherwise, a role is viewed as powerful--then on that basis alone it will tend to be powerful.

Closely related to role power is symbolic power. We learn the religions, patriotisms, or philosophies--the rituals and words and paraphernalia--associated with a given role. The White House is associated with a powerful role, as perhaps also is a simple, plain house in which a Gandhi lives. The role of "chairman" may be re-legitimized by changing it to "chairperson." Proper role behavior tends to limit or direct one's speech and actions so as to conform to the role.

Large organizations tend to be more powerful and have more powerful roles to fill. Even when a role is not filled explicitly based on heredity, there are still some who have a better chance simply because of their parents. One may just happen to have been born a member of the powerful Kennedy family or of the superpowerful U.S.A. nation-state. If one is a member of a powerful community or group, that alone tends to make one

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powerful. On the other hand, by being a member of a community, the community may decide to adjust the power relationships within the community, giving you more or less power. For example, victims of discrimination may argue that the community should re-distribute the power so as to live up to the community's ideals. Different communities have different ideals--including who should or should not be a member of the community. But moral ideals--whatever they may be for a given group--can be very powerful if actual behavior is shown to be contrary to deeply held values, especially if the ideals have been long articulated in sacred documents.

The various kinds of power ecologically interact.[111] In the Middle Ages, sacred power was influential. Sacred power--loyalty to an unquestionable or untouchable ideology--was influential in the twentieth century in Communist countries. Economic power is influential in capitalist countries. With creativity we can think up new forms of power. Perhaps new forms of power can help us achieve a better society.

Some processes involve a great deal of struggle or conflict, others very little.[112] Our solar system, for instance, is not very conflictual--its dynamics are in equilibrium, making the system predictable. Likewise, the phase transformations in the prebiological domain are not very conflictual. In general, the overall pattern of

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biological evolution, too, is not very conflictual; organisms sometimes compete over a scarce supply of food, but this is not organized conflict. The actual process of biogenetic development is not conflictual. Two species may be competitive (even without ever seeing each other), yet on the whole be in some kind of predictable equilibrium or relational process. The so-called "struggle for existence" (dramatized by some creatures with human experience) does not properly characterize the prehuman process of evolution.

In terms of the overall process of biological evolution, Boulding can identify only three areas of conflict, or struggle, none of which seem to be of overriding importance for the evolutionary process. The three conflictual areas are identified by Boulding as 1) territoriality; 2) pecking orders; and, 3) sexual selection.

Perhaps territoriality, when viewed from above, may be seen as a way of using a little struggle to prevent a lot of struggle. Yes, some animals defend, or are willing to defend, their territory from intruders, especially intruders of their own species. Paradoxically, territoriality "creates a smaller niche [i.e., equilibrium population] for the animal in question than it would have if the population were limited only by the food supply."[113] Usually the winner of the highly

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ritualized fight is not hurt, although the loser may die for lack of territory.

The establishment of pecking orders or hierarchy among those who live together likewise seems highly ritualized rather than damaging. Typically a wolf will submit to another wolf before it has sustained very much physical damage. "Any animal whose genetic code instructed it to take fighting seriously would soon be eliminated. . . . Diplomacy rather than war is the norm in nature."[114]

Fighting another to gain a mate, when it occurs, is, again, highly ritualized. Yes, there are food chains, deaths, births, competition, and changes in the biosphere--but only rarely conflict as fighting, "though it does increase as one goes up the evolutionary scale."[115] Conflict is dramatic--humans stand at attention, and overestimate its place in biological evolution. The Hobbesian-Darwinian worldview conflicts with the conflictual realities or non-realities of biological evolution.

Conflict or struggle is more important in the sociosphere than in the biosphere.[116] This is because human decision-making is important: The human image of alternative futures is much more complex than in prehumans. Many human decisions, however, are not resolved by conflict but by accepting, or becoming aware

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of, one's values and ordering or selecting one's activities accordingly. True, considerable competition exists in both the biosphere and the sociosphere, but competition rarely leads to conflict. Yet there are times when basic values do indeed conflict: Boulding calls this a "dilemma."

Most human learning and behavior is nonconflictual or "unviolent": The issue of violence/nonviolence never comes up. We simply make a nonconflictual or unviolent selection among the alternatives. In a so-called "Buridan's ass" scenario familiar to philosophers, the donkey attempts to estimate which bale of hay is best, second best, and so on. But in a "Boulding's ass" scenario, so to speak, the donkey attempts to estimate which smelly skunk is worst, second worst, and so on. One (the approacher) chooses the best bale of hay, the other (the avoider) chooses the least worst smelly skunk. The approacher, unlike the avoider, tends to resolve conflicts or make selections easily. A move toward being well nourished tends to be nonconflictual, Boulding says, but a move away from being hungry suggests a dilemma and the possibility that the conflict may lead to violence.

Baboons are relatively conflictual, gibbons nonconflictual, and gorillas in between.[117] Humans have a wide spectrum of possibilities, wider than the behavioral repertoire of all other primates combined.

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Nevertheless, it is fair to say that fighting is common among humans, especially among children. Because primates experience pain, fighting among them is less ferocious than it otherwise would be. Fighting of human adults has more tendency to occur between groups rather than within groups. "The larger the ingroup, the less fighting there is in general simply because fighting is confined to the borders of groups, and the bigger the groups, the fewer borders there are, culminating, of course, in the group of all mankind, which has no borders."[118] Indeed, some humans see all humans as belonging to a single human group. Some human groups ritualize conflict by holding elections.

Civilization produced large empires, the closing of frontiers, and war. Civilization evolved from wars for conquest--to wars for deterrence. The sociosphere macrolearned: The perceived payoffs (including perceived counter-payoffs) to empire changed.

A sociosphere may evolve a system of peace from a system of war.[119] We can think of an international system as being in one of four phases. 1) Stable war is when peace is practically unknown. 2) Unstable war is when war is interrupted by peace from time to time. 3) Unstable peace is when peace is interrupted by war from time to time. 4) Stable peace is when war is practically unknown. At the present moment the sociosphere generally

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seems to be in a phase of unstable peace, where war is neither quite legitimate nor illegitimate. Nuclear missiles have changed the payoffs but whether the sociosphere will sufficiently macrolearn about these payoffs in time remains to be seen; a sociosphere of stable peace seems possible, as does the sociosphere's extinction.

North America and Scandinavia are examples of stable peace within the present unstable international system. "The phase changes in the international system represent in the main growth of integrative structures. This involves diminishing the costs of conflict by transforming the nature of threats and substituting legal procedures, arbitration, reconciliation, and so on (in other words conflict management) for systems of conquest and deterrence."[120] Within some countries, the relationship between employers and employees resembles unstable peace or even stable peace.

In general, conflicts help determine the details of evolution (e.g., which language will predominate) rather than the larger evolutionary patterns.[121] We may all wear the caps of the winning team, but the overall longterm effect of the sport would differ little if another had won. Perhaps it would be better if Spanish rather than English were the world language, but the

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betterment or effect is slight in comparison to a larger pattern we call the global village.

An exception of sorts to the above generalization is in the case of an emerging watershed or threshold moment.[122] It is difficult or impossible to accurately perceive a moment to be a new watershed until long after the fact, if then. But if a moment happens to be a new watershed, then small details (such as whatever conflicts happen to be around at the time) may throw the system along one great path or another. If one cannot accurately perceive a moment to be a threshold, then it is impossible at the time to have a conflict over the unperceived watershed. Sometimes it is the impetus of loosing (rather than winning) which produces a successful watershed. It is sometimes said that the United States has been historically lucky in that it has usually done the right thing (for the wrong reason).

From the above Boulding concludes that the details of conflict are not very important in evolution as a whole.[123] Accordingly, we should discourage violence, manage conflict, and promote productivity, economic development, and the advancement of knowledge. Too much conflict, no matter how well intentioned, could nullify the past two billion years of evolution on this planet, our home. It is the nonconflictual processes which hold our planet together and offer the possibility of a better

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world. Loose an election, have another election; but destroy Earth, that's it. Evolution "is usually not the result of any contradictions [or of any conflicts]; it is simply the result of cumulative processes of erosion and deposition, coupled with constant mutation [variation] and selection."[124] The conflictual image often found in patriotisms, religions, and sports may be dramatic, but it is an unrealistic image of the larger evolutionary patterns, past and present. Ecological succession, not world war, is the more realistic image.

The Ecodynamics of Religion and Ethics

Humans select what they perceive to be good.[125] Depending on what elements are deemed to make up the good, a change may be interpreted as making things in general either better or worse. I may perceive myself as being in a better or worse state than I was yesterday; Boulding calls this a "state evaluation." On the other hand, I may perceive myself as being better or worse in terms of being nearer or farther from reaching a goal; Boulding calls this a "goal evaluation." "The dialectical processes of conflict can be seen as a special case of goal-oriented behavior and evaluation in which the goal, of course, is to win, to overcome the opponent, to seize power, and so on."[126]

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We can evaluate a system, then, in terms of "state" or in terms of "goal."[127] But we can also evaluate or decide which system, at a given moment, is more valuable than another also existing system. For example, an individual's good and a community's good may not coincide. In some cases we may decide the individual is more important, in other cases that it is the community. Beyond this, as we look at the elements we call good, element A may be good if its quantity is small, whereas a large quantity of element B (but not of element A) is good. This is Boulding's integrative principle of "marginal goodness" not unlike "marginal utility" in economics. There may be exceptions, but in general Aristotle's (golden but flexible) mean applies: "goods become bads if we have too much of them and many bads may become goods if they are diminished sufficiently in quantity."[128]

But in practice it may be that an increase in a specific good will also increase a specific bad: pollution, for example.[129] In practice, goods and bads are often jointly produced, a fact of the evolutionary process. In such case we must flexibly make tradeoffs; the notion of "absolute value" can be very dangerous. Moreover, sometimes prohibition of a slight bad can be very bad. The moralist makes the mistake of thinking that one only needs to show something is bad in order to

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prohibit it. "It does not prove anything, however, to show that something is bad unless we can show that something else, and particularly some achievable combination of things, is better."[130]

We can evaluate a society relative to its perceived past or relative to another society (real or imaginary).[131] Conflict between societies will tend to promote negative identities and exaggeration of perceived goodness/badness. Nevertheless, most presently existing humans tend to see certain common elements as important to having a good society: These "moral goods" include "wealth, power, justice, equality, freedom, meaningfulness, friendliness, health, excitement, sobriety, stability, creativity," and so on.[132] It is possible to put a number on each moral good so as to compare societies in this way. In a less mathematical way, we are indeed apt to compare and evaluate societies; often our own nation-state, whatever country it may be, is evaluated as comparatively good. Such evaluations or perceptions influence the decisions made and therefore the course of societal evolution.

Many of the moral goods suggested above require that the society not be in a state of poverty.[133] Power and wealth, at some level, are therefore unusually important or pivotal moral goods. It seems that if a society is interested in development or betterment, it

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will view wealth and power as special elements in the evolutionary equation. At the same time it is likewise crucial for those countries already wealthy and powerful to realize that there are other moral goods as well. For example, world-wide wealth and justice, at some level, may be good for all in the long run. A poor society may require inequality in order to be able to function so as to improve itself at all. On the other hand, a sufficiently evolved science and technology makes greater equality and mass consumption feasible. (One is tempted to suggest that the advancement of science and technology is necessary but not sufficient for realization of most moral goods.) Paradoxically, science and technology also makes self-extinction of the human species feasible. We must learn how to control technology along with how to properly encourage and manage the advancement of knowledge. Our planet's threat system must be restructured so as to prevent the extinction of the human species.

In looking, then, at the three world-wide systems of threat, exchange, and integration, we can think generally in terms of restructuring the sociosphere so as to rely less on threat learning and more on integrative learning.[134] Nevertheless some cases of threat learning are good and some cases of integrative learning are bad. Large generalizations have both virtues and vices.

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The moral good called "health" is better viewed in terms of quality of life rather than mere survival.[135] Yet one can view ill health as a source of creativity. Looking to the future, Boulding states that the "prolongation of an active human life beyond the present genetically determined span is not wholly off the human agenda if we can discover what the mechanism of aging is and act to correct it. Any effective prolongation of active human life, even say to 100 or 200 years, would present a very deep crisis for existing institutions, all of which are geared to the present level of life expectancy."[136]

"Meaningfulness" and "justice" are two moral goods difficult to define.[137] Justice certainly differs from freedom and from mercy. A shared and exciting goal or vision, perhaps invoking war, conflict, or struggle, may supply a society with meaning. The evolutionary or ecodynamic theory or vision or philosophy may supply meaning.

A perceived gap between the ideal and the real may lead one to proceed to close or narrow the gap.[138] One's behavior to do so may or may not prove successful. Moreover, in the process, successful or unsuccessful, one's image of the ideal may change. If one's behavior is not successful, the gap may not close; if one's ideals change, the gap may not close. If the gap is not closed,

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the ideal may be modified in accordance with the "sour grapes principle." (Boulding identifies this with Buddhism.) Emergent evolution, contrawise, may work to modify the ideal even further from the real, if the old ideal is near realization. Hypocrisy or inconsistency is an exciting, valuable good for some.

Economic takeoff of an underdeveloped society is sometimes possible with a centrally planned economy.[139] Funding of research is needed to work out the details of optimum economic development for the various varieties of nation-states and the world as a whole. However, in general, a government-governed free-market, as in Germany or Japan, seems to be the most productive approach to development.

Religion is related to the fact that humans have "images of themselves and their larger environment."[140] Perhaps the first specialization was that of priest. Religion has both united and separated peoples; separation of church and state is a recent practical adjustment to this fact.

Humans seek a sense of order and of their place or identity within it.[141] Humans demand a worldview permitting both celebration and consolation. Magic was an early attempt to find order and control nature. They wanted the magic to work, so they perceived it as

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working. But in the long run, truth presumably has a slight advantage over falsehood.

A number of biological species will expel or kill an individual if it fails to perform its proper function in the community.[142] This is a kind of ethical or proto-ethical behavior. Humans interactively learn their values, and they learn to differentiate between their private values and the widely shared public ethic. What individual variation is allowed varies from culture to culture. In general, a larger population and geographical area is more tolerant.

We can think of ethical dynamics or evolution within a society and also among societies.[143] The public good is regulated in part by punishment to law breakers. In theory at least, the public good could also be regulated in part by reward to law abiders. Reward is supposed to make for a higher quality learning experience than punishment.

Boulding speaks of "doers" and "stoppers." Doers do right or wrong. Stoppers stop wrong. What is not being done, which should be done, to improve society? This question is not often asked, but it is an important one if we wish to do good (an evolving society) rather than to stop wrong (a stagnant society).

In addition to doers and stoppers, there are also "takers." They take from society more than they give.

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Too many takers, and the society is in trouble. Private property encourages both doers (in the form of making wealth or producing) and takers (in the image of the idle wealthy). Centrally planned economies, and bureaucracies generally, are stoppers. A new social invention is needed here.

Societies interact with each other; the results of the interaction may produce superpowers.[144] In the past, societies have frequently had one set of behavioral values for those of the in-group, another for out-groups. "We now seem to be approaching the stage in the history of the human race when the union of the internal and the external ethic will have to be achieved; otherwise, the external ethic will destroy us all. Some form of world community, expressed perhaps in novel political institutions that have not yet been thought of, seems to be the only answer to the technical collapse of isolation."[145]

Religion, reason, and ethics in the sociosphere are all human artifacts among other human artifacts.[146] The evolutionary pattern leads one to believe that very possibly religion, reason, and ethics are each continuing to evolve rather than reaching an equilibrium. "In the future we may be able [e.g., via computers] to perceive patterns and handle models of a complexity far beyond our present capability. Should this enable us to perceive

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the patterns underlying the human learning process itself, this might indeed constitute another gear change in the long process of evolution with a further acceleration of the evolutionary pattern through time."[147]

Limits, Evolution, and the Future

By projecting (as distinguished from predicting) certain assumptions and trends about population-resources-environment into the future, the Club of Rome has dramatically called attention to the "overshoot" or without-warning pattern which may lead to world-wide, ecological disasters.[148] One way to prevent humans from the overshooting of ecological limits is by producing inventions which allow expansion of the human niche. For example, is a high-technology equilibrium feasible, as we look at the ecological issues involved? Along with a population explosion, there is also a knowledge explosion in the global village. From the mid nineteenth century we have seen an explosion of science-based technology. For example, the chemical industry provided us with control over malaria, a fact directly related to the population explosion.

Due primarily to differential development, then, rather than to exploitation, the gap between rich and poor continues to widen.[149] Differential development is

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explained by Boulding in terms of the so-called "Matthew principle" of "the more wealth [and scientific knowledge] one has, the easier it becomes to accumulate more."[150] Most of the human species, as we enter the twenty-first century, lives at subsistence level. There is a great gulf indeed between the subsistence culture and the superculture.

What is feasible over the next century or two?[151] Fortunately there are many energy options available to the future beyond gas and oil; likewise, exhaustion of material resources does not appear to be an insurmountable problem. Pollution jointly yields both goods and bads, so one must look at the net tradeoffs. Only humans have a linear economy or ecology; one of our technological goals should be to develop a high level cyclical (not linear) economy/ecology. (This is Boulding's famous distinction between "cowboy" and "spaceman.") In the meantime, segregation of waste way be feasible (e.g., shooting radioactive materials out into space). There is much that we do not know about pollution and the biosphere. This issue of world-wide importance obviously deserves funding now for proper research and development. Over the last several decades, to be sure, there have indeed been some improvements in the environment. But the great danger is in what we do not know, yet need to know--knowledge regarding trigger

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effects, new chemicals, and so on. We must "be on the lookout for the invisible dangers, where our small activities may turn out to have large effects."[152]

One of the greatest dangers we face is the human population explosion; in our maps of Earth there are no longer great empty or unknown regions.[153] The population explosion is occurring in areas which are already crowded (say, south Asia) or which are hostile to habitation (say, tropical Africa). Although Boulding is not prepared to rule it out entirely without appeal, he finds emigration into outer space an unlikely solution. (Boulding asks us to consider the sheer number of spaceships which would have to leave Earth on a continuing basis, to cite only one potential difficulty.) Boulding concludes, therefore, that there "is no acceptable solution to this problem short of bringing the birth rate down to the death rate. There is an unacceptable solution, which is to bring the death rate up to the birth rate."[154]

One can think of providing grants from the rich countries to the poor countries aimed at population control.[155] This is easy to say, but the individual, the community, and the international social dynamics of the situation make it very difficult, perhaps requiring research and new social inventions. "Unless grants from the rich to the poor countries can be tied to an

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effective method of population control, they are likely to be ineffective and may simply increase the ultimate sum of human misery and the size of the eventual disaster."[156] "The abandonment of the European empires may indeed be a prelude to an abandonment of responsibility. Independence might be construed as simply prying the clutching fingers of the old colonies off the gunwale of the lifeboat."[157]

What are the limits to learning?[158] Threat learning has established, or helped establish, civilization--but is unable to take us to a higher level before we exterminate ourselves. With science and its technology we now know that something better than mere civilization is possible. Whether postcivilization is sustainable is another question. For example, one can imagine decline rather than advance over the next century or two. "Many systems seem to exhibit what might be called a 'balloon pattern' of rising to some kind of ceiling, but then losing buoyancy and sinking slowly but surely below the maximum point."[159]

Exchange learning has played a productive role in the evolution of civilization; it helped produce social inventions (such as money and corporations), a variety of material artifacts, and wealth.[160] Exchange learning also produced its well known pathologies; in any case, its ability to generate community is limited.

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Civilization legitimated exchange learning; delegitimating exchange learning can be dangerous if a society has not worked out feasible alternative legitimacies.

In general, it is not obvious if there are any long run limits to integrative learning.[161] To be sure, there are divorces and civil wars. New social inventions or evolutionary developments may even show that threat and exchange learning are not as senile or used up or limited as previously suggested. The future is uncertain in that we do not know if there are any ultimate limits to learning, or whether such limits may be near or distant. If the future is uncertain, one may nevertheless expect that there is both more to learn and that we can learn to learn it. The learning of world community and of knowledge increase appear to be in the human future if humans are to have a future.

Boulding identifies three patterns of equilibrium which can sometimes be useful if one wishes to project the past into the future.[162] A given system may fit relatively well or poorly into one of these equilibrium patterns. Eclipses are an example of the mechanical dynamics pattern. The weather is an example of the turbulent equilibrium systems pattern. And kittens are an example of the pattern of planned growth/decay. Evolution itself does not fit any of these patterns.

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Unlike prehumans, humans can imagine a wide variety of alternative futures; "all decisions are about the future and all our experience and records are of the past. It is only as we see patterns in this past record that we have any hope of making projections of the future and of making decisions that will change the future in ways that we desire."[163] Patterns of simple mechanical equilibrium, such as movement of the planets around the sun, can be projected with relative certainty. Likewise in the case of a system in the process of becoming a stable equilibrium; the preceeding details may be difficult to predict, but eventually the apple will fall from the tree to the ground.

Some equilibrium systems oscillate in an apparent random pattern. If we look at Earth's weather season after season, there does appear to be a "turbulent equilibrium systems" pattern, but exact day by day prediction is difficult. Projections of the weather are less certain than celestial mechanics.

Bio-organisms tend to maintain a kind of equilibrium state, showing a certain amount of dynamic autonomy in the face of external change. "Both growth and aging are continuous failures of the homeostatic mechanism, but this too follows an equilibrium path" which Boulding calls a "creode" or pattern of planned growth/decay.[164] A kitten becomes a cat, not a goat.

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If the notion of a creode is obviously useful in understanding some aspects of the biosphere, its usefulness in understanding the sociosphere is less obvious.

"Evolution has been a disequilibrium system from the very beginning. Whether it has some very long-run cyclical equilibrium between the alpha and omega points of Teilhard we do not know, and there has not been time to find out."[165] The pattern of evolution (the process of variation and selection) "has great interpretive power but remarkably little predictive power."[166]

Accordingly, equilibrium projections will yield inaccurate predictions of the overall long-run future which will actually evolve.[167] Our various images of the future and our decision-making should take this apparent fact into account. In any case, some alternative futures will be perceived as more or less likely or feasible. Moreover, some kinds of predictions seem less foolhearty than others: "It does not seem wholly impossible that we might re-create the dinosaur within a hundred years, but we certainly cannot predict [in complete detail exactly] how to do it" or we would already be able to do it.[168]

Demographic projections have been based on the simple mechanical equilibrium pattern: "all population projections have been wrong, simply because the

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parameters have not been constant."[169] On the other hand, that south Asia and tropical Africa are in the midst of a very dangerous population explosion is difficult to dispute; perhaps here the women's movement may take on the role of world leadership: "Just as the whole concept of empire collapsed in the mid-twentieth century, it may be that the age-long concept of the subjection of women will likewise collapse in its fourth quarter," thereby assisting in the control of population.[170]

Econometric projections run into the same general kinds of difficulties as demographic projections.[171] Nevertheless it is important to perform such calculations in an attempt to advance futuristics. We need to add details to our models, and determine alternative results as we vary the parameters. We should look at the world with an eye toward identification of instabilities in the parameters of the system under scrutiny. Moreover, we should also consider that in the long run it is probable that the improbable will occur.

If it is difficult to predict changes in demographic and economic parameters, it is even more difficult in matters social-political.[172] Moreover, one must consider Boulding's so-called "iceberg effect." An individual or public image may simultaneously hold two contradictory moods, legitimacies, or values. An

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invisible melting of one mood may shift the center of gravity so that the other mood suddenly changes places with the mood which was previously dominate. Since we lack knowledge of the "icebergs" which melted only somewhat and without overturning, this effect is difficult to study, Boulding points out.

One example of the iceberg pattern is in our mutual desire for union and separation.[173] "The Soviet Union . . . is the last of the great nineteenth century empires . . . and it will not be at all surprising to see it break up."[174] Likewise, "it will not be at all surprising to see India break up into ten or a dozen different states."[175] On the other hand, re-union of Korea, Germany, or China seems at least possible if unlikely.

What, then, does the future hold for world government?[176] Unfortunately, learning from war rather than from foresight has been more responsible for our evolution from the Concert of Europe to the League of Nations to the United Nations. Yet, with a budget comparable to that of the Ford Foundation, the U.N. is poorly designed for effectiveness; nevertheless, the U.N. has been more effective than we have had any right to expect. One might say that its legitimacy flows from the future rather than from the past. Yet its structural

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design seems to leave the U.N. little potential for growth.

A major question for the twenty-first century is whether world economic and cultural developments will create a viable world integrative system of human identity and learning. Yet a world federal "government that has no external enemies is hard for us to visualize."[177] It is certainly possible that what is needed here is a new social invention of some sort. We need to find a way to achieve a minimum amount of world unity for feasibly dealing with international and world problems; this includes conversion of the world's military-academic-industrial complex to civilian uses. It may be that this learning process will come about due to future wars or other catastrophes; foresight learning would seem to be preferable, however.

If political evolution is uncertain, social developments are even more unpredictable.[178] Nevertheless, let us not play ostrich, but at least attempt to look at the future of the family, the arts, sex, and religion. The nuclear family is known to prehumans and is widely known to humans throughout human history. Accordingly, one here has a tendency not to see historical discontinuity but nuclear families, in the future.

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Will sexual customs change over the next century or two?[179] Historically, the middle class has been less likely than the upper or lower classes to engage in sexual freedom. Yet the middle class can become more sexually free--for example, due to increasing wealth or because of the de-religionization or scientificization of sex. It may be that sexual freedom is here to stay, that it will increase its niche, rather than conforming to a cyclical pattern. On the other hand, there may be an almost genetic connection of sex with passion or emotion rather than mere entertainment; accordingly, some new form of Puritanism would not be surprising.

Every or almost every past human culture has had families, religion, and art.[180] Financial patronage of the arts, as well as lack of financial support, are problems artists have only sometimes been able to transcend; "there is no substitute for the fine arts in which the artist does his own thing."[181] Once a new religion becomes firmly established it is unlikely to become extinct. It seems that the rise of philosophy and science has done little to reduce the religious niche. In the late eighteenth century, 7 percent of the Americans were church members; today, most Americans are church members. Religion seems to increase its niche when a country institutes separation of church and state. Boulding also notes that one often finds a connection

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between religious and sexual customs. It seems likely that new forms of religion will arise in the future. "The religions of hell and of trading on the hope of heaven may give way to religions of grace and love."[182]

If, over the next century or two, we are going to avoid catastrophe and successfully negotiate a transition to postcivilization, then we must find a way to reach a high-technology yet sustainable society on a world scale.[183] The creation of the right kind of artificial environment on a global scale would encourage learning and nourish dreaming. The "dream of a world free from war, crushing poverty, and debilitating riches" may engender the very courage and hard work necessary for its eventual realization.[184] Accordingly, the age of Aquarius, the twenty-first century, is <u>not</u> an age of leisure and abundance. "Aquarius is the only good Puritan among all the signs of the zodiac, trudging eternally with his waterport around the heavens. . . . It may be indeed that the earnest, hardworking Aquarius, bearing a little of the mysterious water of life, will symbolize what will carry us through into a better world for our descendants."[185]

I may have an image of an attractive fruit or of an alternative future.[186] I tend to associate a given image (at a given time and place) with reality or with fantasy. The question of reality or Truth is one which

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philosophers have asked at least since the days of ancient Greece. The ordinary person is more likely to simply exclaim, as seems appropriate, that the image in my mind is real because the apple is obviously sitting in front of me on the table; or it is obvious the apple is not sitting there but is "only" in my mind. Alternatively, I may be unsure what I am seeing and walk over to examine the object. This future examination will tend to either confirm (as distinguished from prove) or falsify the hypothesis/image.

Confirming or falsifying a complex image, especially when many important details of the image are missing, is more difficult. Boulding's ecodynamic or evolutionary social philosophy is indeed a complex and incomplete image. Our evolutionary image of the universe is like a highly flawed 3-D movie or a jigsaw puzzle mostly unassembled. It may be that there is no way all the pieces will fit together--yet even a flawed faith seems preferable to dismal despair. Perhaps the evolutionary image will be superseded by a new (revolutionary) paradigm. "We have to achieve a queer combination of faith, humility, and pride. . . . Reorganizations, we should notice, often take place as the puzzle approaches completion."[187]

Even if it is for the purpose of incorporation into the evolutionary image, nonevolutionary images deserve

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respect.[188] Whether the larger unperceived pattern or image will be evolutionary or nonevolutionary we do not know. Nevertheless it can make sense, as a working hypothesis or tentative image, to suppose that the nonevolutionary images are species nearly extinct, and that on this basis they are worthy of study. On the other hand: "in ecological succession and in evolution later species do not necessarily replace earlier species, but coexist with them."[189] Sometimes older may be better. "The niche of any image is limited by the human needs and activities that surround it."[190] For walking around town, a flat earth image is better than an image which gives one vertigo. One may argue that astrology and astronomy are inconsistent with each other; yet, whether in terms of an individual or a society, each view may have its niche. Sometimes inconsistency (perhaps with a bent toward reality testing) may be better than consistency (perhaps with a disinterest in reality testing) even if fragmentation or a schizoid personality/society in general or on the whole is undesirable.

At least four kinds of species of images coexist in the noosphere of the sociosphere along with the ecodynamic or evolutionary image.[191] (On the other hand, an ideology is better characterized as an ecosystem of various species within the noosphere.) The four

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alternative kinds of species of "images of the 'larger pattern,' . . . are: animism, creationism, materialism, and revolutionism."[192] Animism views the universe and its constituent objects (physical, biological, human) as persons, although persons may be more or less complex. Even in the developed world we sometimes seem to speak of automobiles or nation-states as if they were persons or animals. Perhaps, at least in part, animism explains patriotism. Applying personhood (unified inner experience) or animism to nonhuman and nonanimal objects may also serve useful purposes of abstraction if we wish to simplify complexity so as to make it understandable and manageable.

Human introspection suggests animism; the productive activities of humans suggest creationism.[193] Humans create artifacts for a purpose. We can suppose that everything was created for a purpose. For example, God created a universe, and God or angels or the universe created the artifacts around us other than the human-made ones. Western religion has a more creationist bent than Eastern religion. Belief in the one and good God hypothesis tends to be self-justifying and have survival value: It will not infrequently "turn bad luck to advantage and guard against mistaking good luck for personal skill. Then we can see why perhaps agnostic evolutionism makes remarkably little dent on the niches

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of a vigorous creationism."[194] (Soviet Marxism was perhaps a form of atheistic "social creationism" in that it saw humans as highly malleable despite their genetic structure. Unlike Mr. Scopes in the United States, some geneticists in the Soviet Union were actually killed for their supposed "immorality.")

A mechanistic view of the universe is easily compatible with a mechanistic view of reason, and translatable in religion into deism. Mechanistic approaches to nature, reason, and religion were viewed with a certain amount of favor during the Enlightenment. Perhaps today the question is not so much the compatibility of western religion with a mechanical universe, but of theistic creationism with an evolutionary or ecodynamic universe. The answer to this question is not obvious; at least for the moment, the ecodynamic view must be noncommittal or open-minded or agnostic, rather than theistic or atheistic. Rather than answering the "God question," scientists may find it more feasible and fruitful to attempt to develop answers to questions about how precisely it is that niches evolve, a crucial but understudied issue.

The mechanistic, reductionistic, and materialistic views of how things work are all related, according to Boulding.[195] Is the universe "nothing but" a "machine"? Can the universe be fully explained by reducing it all to

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physical science? Is the universe ultimately "nothing but" matter or matter-energy? To be sure, the mechanistic approach has been scientifically fruitful, unlike the approach of the vitalists. But the evolutionary approach has also been fruitful and useful. The ecodynamic image is more friendly to "both-and" than to "nothing-but" interpretations.

Within the history of the universe there have been periods of rapid change.[196] The revolutionary outlook tends to see the revolutions and not see the evolutionary background. Some events seem to have a regular or predictable rhythm of succession; other events are rare and irregular. Given a long enough period of time (say, ten billion years), a rare event (say, one chance in one billion on an annual basis) is almost certain to happen. The science of the laboratory deals with regular rather than with rare events. One variety of revolutionism is "liberationism," which makes the mistake of believing that most evil is due to oppression and oppressors.

In making the transition, over the next century or two, from civilization to postcivilization, what is it we need to learn?[197] According to Boulding we need to learn a combination of intellectual excellence (reality-testing) and compassionate commitment (radical passion); this Boulding calls "realistic radicalism." Ideally, the various religious and political ideologies should

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transform themselves into varieties of realistic radicalism. As we attempt to truthfully or realistically look at ecodynamic processes, we discover some illusions, five dangerous images, in the noosphere.

The first illusion to overcome is the image of "static distribution." As previously explained, and contrary to what many believe, the poor are not poor primarily because the rich exploit the poor and there is just so much to go around. Cooperative productivity, not conflict between rich and poor, is the way to global development.

The second illusion to overcome is the image of "class interest." As previously explained, and contrary to what many believe, "class struggle" very poorly explains the course of human history. "Neither the workers of the world nor the capitalists unite."[198]

The third illusion to overcome is the image of "revolutionism." Revolutionism thinks the key to world betterment is to replace bad people with good people. That's what the Russian Revolution was about. While presumably its good to have good people for our leaders, we must keep a realistic eye on the long term evolutionary dynamics of societies.

The fourth illusion to overcome is "meliorism." Meliorism thinks the key to world betterment is to replace bad institutions with good institutions. Again,

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this sounds neat and simple, yet we should keep our eye on the long term. We must learn to think in ecodynamic, not static terms: "unless institutional devices can be found to put the individual into a local and immediate environment in which what is best for the individual is also best for the society, a recurrent tragedy seems almost inevitable."[199] (The population explosion is one example of the "tragedy of the commons.")

The fifth illusion to overcome is something like "evilphobia." Evilphobia thinks that all we have to do to have a good society is to do away with evil. But in fact the good is a delicate flower which needs long term care if it is not to whither or die.

The ecodynamic view is unfriendly to the romantization or worship of nature (animism).[200] It is humans, or some humans, not nature, who care about endangered species, for example. The ecodynamic view is also unfriendly to monistic interpretations of history, whether they be theistic (theistic/creationist), mechanistic (mechanistic/materialistic/reductionistic), or revolutionary (revolutionary/Marxist). Ecodynamic philosophy incorporates mechanistic and revolutionary explanations as appropriate, however. And at least at the present stage in the development of the ecodynamic view, it is neither theistic nor atheistic, but agnostic or open-minded or noncommittal.

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May ecodynamic philosophy help us "go from bad to better rather than from bad to worse"?[201] May we improve the human evaluative (and, therefore, the cosmic selective) process? "It may well be that biological evolution is approaching its end and that it will be succeeded by an evolutionary process wholly dominated by noogenetic processes directed by human values."[202]

The ecodynamic process coordinates human values.[203] A community, or society of communities, macrolearns. Threat, exchange, and integration motivate learning and macrolearning, or the coordination of values at the individual and organizational (even global) levels. Legitimated threat, a market economy, and good faith dialogue teach us values. Boulding is optimistic that in these three ways we will learn of the complexities of human betterment and successfully negotiate the great transition to postcivilization.

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NOTES

1. Pierre Teilhard de Chardin, The Phenomenon of Man (New York: Harper & Row, 1959). English translation by Bernard Wall. Introduciton by Sir Julian Huxley. Second Harper Torchbook edition published 1965.

2. Much of this paragraph and the two following paragraphs is based on Kenneth E. Boulding, Ecodynamics: A New Theory of Societal Evolution (Beverly Hills, CA: Sage Publications, 1978 and 1981), 9-11.

3. Much of this paragraph is based on Boulding, Ecodynamics, 26-7.

4. Much of this paragraph is based on Boulding, Ecodynamics, 39-41.

5. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 41-2.

6. Much of this paragraph is based on Boulding, Ecodynamics, 42-3.

7. Much of this paragraph is based on Boulding, Ecodynamics, 43-4.

8. Much of this paragraph is based on Boulding, Ecodynamics, 44-9.

9. Much of this paragraph is based on Boulding, Ecodynamics, 49-50.

10. Much of this paragraph is based on Boulding, Ecodynamics, 50-2.

11. Much of this paragraph is based on Boulding, Ecodynamics, 53-4.

12. Much of this paragraph is based on Boulding, Ecodynamics, 55-6.

13. Much of this paragraph is based on Boulding, Ecodynamics, 56-8.

14. Boulding, Ecodynamics, 62.

15. Much of this paragraph is based on Boulding, Ecodynamics, 62-6.

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16. Much of this paragraph is based on Boulding, Ecodynamics, 67-71.

17. The seven kinds of ecological interactions are discussed in Boulding, Ecodynamics, 78-82.

18. Boulding, Ecodynamics, 79.

19. Ibid.

20. Ibid., 79-80.

21. Ibid., 80.

22. Ibid.

23. Ibid., 81.

24. Ibid.

25. Much of this paragraph is based on Boulding, Ecodynamics, 81.

26. Much of this paragraph is based on Boulding, Ecodynamics, 81-2.

27. Boulding, Ecodynamics, 82.

28. Ibid.

29. The three types of dynamics are discussed in Boulding, Ecodynamics, 82-5.

30. Boulding, Ecodynamics, 84.

31. Ibid., 88.

32. Ibid., 87.

33. Much of this paragraph is based on Boulding, Ecodynamics, 99-100.

34. The five aspects are discussed in Boulding, Ecodynamics, 100-11.

35. Boulding, Ecodynamics, 102.

36. Ibid., 103.

37. Ibid., 107.

38. Ibid., 108.

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39. Ibid., 109.

40. Ibid., 110.

41. Ibid.

42. Ibid., 119.

43. Much of this paragraph is based on Boulding, Ecodynamics, 109-11.

44. Much of this paragraph is based on Boulding, Ecodynamics, 111-2.

45. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 112-6.

46. Boulding, Ecodynamics, 115.

47. Ibid., 116.

48. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 121-2.

49. Much of this paragraph is based on Boulding, Ecodynamics, 122-3.

50. Much of this paragraph is based on Boulding, Ecodynamics, 121-2.

51. Much of this paragraph is based on Boulding, Ecodynamics, 122-4.

52. Boulding, Ecodynamics, 123.

53. Much of this paragraph is based on Boulding, Ecodynamics, 124.

54. Boulding, Ecodynamics, 124.

55. Much of this paragraph is based on Boulding, Ecodynamics, 124-6.

56. Boulding, Ecodynamics, 125.

57. Ibid., 133.

58. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 126-7.

59. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 128.

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60. Much of this paragraph is based on Boulding, Ecodynamics, 129-30.

61. Much of this paragraph is based on Boulding, Ecodynamics, 130-2.

62. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 132-3.

63. Much of this paragraph is based on Boulding, Ecodynamics, 133-4.

64. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 134-5.

65. Much of this paragraph is based on Boulding, Ecodynamics, 135-6.

66. Much of this paragraph is based on Boulding, Ecodynamics, 136-8.

67. Much of this paragraph is based on Boulding, Ecodynamics, 136-8.

68. Much of this paragraph is based on Boulding, Ecodynamics, 138.

69. Much of this paragraph is based on Boulding, Ecodynamics, 138-9.

70. Much of this paragraph and the three following paragraphs is based on Boulding, Ecodynamics, 139-40.

71. Much of this paragraph and the nine following paragraphs is based on Boulding, Ecodynamics, 141-54.

72. Much of this paragraph and the two following paragraphs is based on Boulding, Ecodynamics, 154-5.

73. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 155-6.

74. Much of this paragraph and the two following paragraphs is based on Boulding, Ecodynamics, 156-7.

75. Much of this paragraph is based on Boulding, Ecodynamics, 163.

76. Much of this paragraph is based on Boulding, Ecodynamics, 164-7.

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77. Much of this paragraph is based on Boulding, Ecodynamics, 167-70.

78. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 170-3.

79. Much of this paragraph is based on Boulding, Ecodynamics, 173-5.

80. Much of this paragraph is based on Boulding, Ecodynamics, 175-6.

81. Much of this paragraph is based on Boulding, Ecodynamics, 178-82.

82. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 189.

83. Much of this paragraph is based on Boulding, Ecodynamics, 190-1.

84. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 191-2.

85. Boulding, Ecodynamics, 141.

86. Ibid., 163.

87. Ibid., 190.

88. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 192-3.

89. Much of this paragraph is based on Boulding, Ecodynamics, 194-6.

90. Much of this paragraph is based on Boulding, Ecodynamics, 196-7.

91. Much of this paragraph is based on Boulding, Ecodynamics, 197-8.

92. Much of this paragraph is based on Boulding, Ecodynamics, 198-200.

93. Much of this paragraph is based on Boulding, Ecodynamics, 201-3.

94. Much of this paragraph is based on Boulding, Ecodynamics, 203-4.

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95. Much of this paragraph and the following three paragraphs is based on Boulding, Ecodynamics, 204-7.

96. Much of this section is based on Boulding, Ecodynamics, 211-9.

97. Much of this paragraph is based on Boulding, Ecodynamics, 219-20.

98. Much of this paragraph is based on Boulding, Ecodynamics, 220-2.

99. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 222-4.

100. Much of this paragraph and the four following paragraphs is based on Boulding, Ecodynamics, 224-8.

101. Boulding, Ecodynamics, 224.

102. Ibid., 225.

103. Ibid.

104. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 233-5.

105. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 234-8.

106. Much of this paragraph and the three following paragraphs is based on Boulding, Ecodynamics, 239-40.

107. Boulding, Ecodynamics, 239.

108. Ibid., 240.

109. Much of this paragraph and the eight following paragraphs is based on Boulding, Ecodynamics, 240-8.

110. Much of this paragraph and the two following paragraphs is based on Boulding, Ecodynamics, 248-51.

111. Much of this paragraph is based on Boulding, Ecodynamics, 251-2.

112. Much of this paragraph and the four following paragraphs is based on Boulding, Ecodynamics, 253-6.

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117. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 258-61.

118. Boulding, Ecodynamics, 259.

119. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 261-2.

120. Boulding, Ecodynamics, 261.

121. Much of this paragraph is based on Boulding, Ecodynamics, 262-5.

122. Much of this paragraph is based on Boulding, Ecodynamics, 265-6.

123. Much of this paragraph is based on Boulding, Ecodynamics, 266-7.

124. Boulding, Ecodynamics, 267.

125. Much of this paragraph is based on Boulding, Ecodynamics, 269-71.

126. Boulding, Ecodynamics, 271.

127. Much of this paragraph is based on Boulding, Ecodynamics, 271-2.

128. Boulding, Ecodynamics, 272.

129. Much of this paragraph is based on Boulding, Ecodynamics, 272-3.

130. Boulding, Ecodynamics, 273.

131. Much of this paragraph is based on Boulding, Ecodynamics, 273-4.

132. Boulding, Ecodynamics, 274.

133. Much of this paragraph is based on Boulding, Ecodynamics, 275-7.

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134. Much of this paragraph is based on Boulding, Ecodynamics, 277.

135. Much of this paragraph is based on Boulding, Ecodynamics, 279.

136. Boulding, Ecodynamics, 279.

137. Much of this paragraph is based on Boulding, Ecodynamics, 278-80.

138. Much of this paragraph is based on Boulding, Ecodynamics, 280.

139. Much of this paragraph is based on Boulding, Ecodynamics, 280-1.

140. Much of this paragraph is based on Boulding, Ecodynamics, 307-8.

141. Much of this paragraph is based on Boulding, Ecodynamics, 310-1.

142. Much of this paragraph is based on Boulding, Ecodynamics, 312-4.

143. Much of this paragraph and the following two paragraphs is based on Boulding, Ecodynamics, 314-8.

144. Much of this paragraph is based on Boulding, Ecodynamics, 318-20.

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146. Much of this paragraph is based on Boulding, Ecodynamics, 320-1.

147. Boulding, Ecodynamics, 321.

148. Much of this paragraph is based on Boulding, Ecodynamics, 289-91.

149. Much of this paragraph is based on Boulding, Ecodynamics, 291-3.

150. Boulding, Ecodynamics, 282.

151. Much of this paragraph is based on Boulding, Ecodynamics, 293-8.

152. Boulding, Ecodynamics, 298.

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153. Much of this paragraph is based on Boulding, Ecodynamics, 298-300.

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156. Boulding, Ecodynamics, 301.

157. Ibid., 302.

158. Much of this paragraph is based on Boulding, Ecodynamics, 302.

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160. Much of this paragraph is based on Boulding, Ecodynamics, 302-3.

161. Much of this paragraph is based on Boulding, Ecodynamics, 304.

162. Much of this paragraph and the three following paragraphs is based on Boulding, Ecodynamics, 323-5.

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164. Ibid., 325.

165. Much of this paragraph is based on Boulding, Ecodynamics, 325-6.

166. Boulding, Ecodynamics, 326.

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168. Boulding, Ecodynamics, 327.

169. Ibid.

170. Ibid., 329.

171. Much of this paragraph is based on Boulding, Ecodynamics, 329.

172. Much of this paragraph is based on Boulding, Ecodynamics, 330.

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176. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 332-4.

177. Boulding, Ecodynamics, 333.

178. Much of this paragraph is based on Boulding, Ecodynamics, 334-5.

179. Much of this paragraph is based on Boulding, Ecodynamics, 335-6.

180. Much of this paragraph is based on Boulding, Ecodynamics, 336-8.

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186. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 341-2.

187. Boulding, Ecodynamics, 342.

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191. Much of this paragraph is based on Boulding, Ecodynamics, 343-5.

192. Boulding, Ecodynamics, 343.

193. Much of this paragraph and the following paragraph is based on Boulding, Ecodynamics, 345-7.

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194. Boulding, Ecodynamics, 346.

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196. Much of this paragraph is based on Boulding, Ecodynamics, 350-2.

197. Much of this paragraph and the five following paragraphs is based on Boulding, Ecodynamics, 355-9.

198. Boulding, Ecodynamics, 358.

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200. Much of this paragraph is based on Boulding, Ecodynamics, 19-21.

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CHAPTER 3

BOULDING ON LEARNING

The previous chapter presented Boulding's general social philosophy, based on his Ecodynamics. The present chapter describes his views specifically on education and learning, based on The Image and on his Collected Papers. Precisely 31 articles appearing in his Collected Papers are explicitly identified in the notes to the present chapter.[1]

Knowledge, Behavior, and Learning[2]

As if out of chaos, we find ourselves having "images," receiving and sending messages, and making interpretations. We come to believe that we have knowledge of things--knowledge of facts and of values. We have knowledge of reality/fantasy and of good/evil, yet our knowledge structure changes, sometimes radically. Nevertheless, we continue to believe in knowledge. Boulding sometimes uniquely uses the term "image" to mean knowledge, or knowledge structure, in this developmental or non-absolute sense. He juxtaposes this common-sense

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or scientific knowledge to the absolute Truth sometimes alluded to by philosophers or theologians.

Boulding wants to establish a science of the image; this science he calls eiconics. And philosophers interested in the philosophy of science may also be interested in the philosophy of the science of eiconics. Eiconics shares with science generally an apparent inability to answer philosophic questions about ultimate reality or absolute Truth. Philosophers of science and of eiconics likewise may have difficulty in determining the proper meaning(s) and methodology(ies) of science, and to what extent, if at all, science is truthful.

Such judgments of truth, whether in science, philosophy, or everyday life, are based on one's image of the world. Based on the image, one chooses an alternative future and then behaves or acts accordingly. One's developing image changes based on the feedback of internal and external messages. The scientific image attempts to structure such messages so as to make the scientific image more accurate or useful. (One is tempted to compare Kuhn's notion of paradigm change, "normal" versus "revolutionary," with Boulding's account of learning, i.e., image modification; this however is beyond the scope of the present investigation.) Eiconics (i.e., the science of the image) does not answer the question of ultimate truth and illusion, although the

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image judges what is real and unreal. The judgment is made on the basis of the image and of internal and external messages.

Eiconics is a way of interpreting the ongoing process of our feeling, thinking, acting. It does not predict what our future messages or image will be. Typical adult humans, however, are apparently structured so as to believe in the existence of an outside world and of other persons. This belief may eventually turn into disbelief, but in the meantime we have to make certain assumptions in order to give direction or purpose to our life. Therefore, on an interim basis, eiconics, like many other disciplines, assumes or may assume that the outside would and other persons exist.

Boulding has an image of the world. This may be characterized as Boulding's knowledge of the world or knowledge structure or interpretation of the world or interpretative structure or the sum of what he believes and feels to be and not to be the case. The image, then, is tentative or "as if" knowledge rather than absolute or unalterable Truth.

If this account of knowledge may be generalized to all humans, then the behavior of every human organism is based on its image of the world; indeed, in some sense of "image," it seems reasonable to say that every organism has an image of the world and that its behavior is based

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on the image. If the image (as "knowledge") explains behavior, how do we explain "learning" (i.e., a change in the image)? Messages (i.e., structured or "mini-image" experiences) interact with one's image of the world. According to Boulding, a message may interact with an image in three or four ways: 1) The message is ignored; 2) The message changes one's image of the world in a "normal" way, in a manner like an addition or a simple modification; 3) The message changes one's image of the world in a "revolutionary" way, as if the message had hit the nucleus of the image; and, possibly, 4) The message may make one more certain or less certain of some thing(s).

An image may be well integrated or poorly integrated. Perhaps some in mental hospitals are more interested in Truth rather than in truths and are well integrated--even if, according to our own image standards, they are living a life of fantasy. Perhaps some not in mental hospitals are less interested in Truth rather than in truths and are poorly integrated--even if, according to our own image standards, they are living a schizoid or suboptimum life. The theory of the image is compatible with, and can explain, the existence of multiple personalities--although it is perhaps not immediately obvious if the eiconic theorist should necessarily identify multiple personalities as a disorder

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to be corrected. (Although perhaps extremely unlikely, one can at least imagine multiple personality cases which cause no insurmountable practical difficulties.)

As behavior becomes more complex, so does the image. It seems more important to view an Adam, rather than an atom, as having an image. A human person is not a mere mechanism or black box and, moreover, does not want to be viewed that way. Boulding identifies seven or eight levels of image complexity, as follows:

1) The static structure. A structure or order or pattern or thing exists instead of chaos.

2) The clockwork structure. The structure contains simple mechanistic dynamics.

3) The thermostat. A homeostatic control mechanism or cybernetic structure has a definite image or worldview which positively values informational feedback and equilibrium. It acts only when its image of the outside world fails to conform to its image of values.

4) The biological cell. This cybernetic structure maintains itself via metabolism and can reproduce.

5) The plant. A plant contains a variety of specialized cells devoted to the plant as a whole. It has a sense of the proper time or season in that it knows how to develop from seed to plant to seed.

6) The animal. An animal is aware and mobile, with periods of wake and sleep; unlike individual plants,

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an individual animal has considerable ability to learn. Moreover, "the more highly developed dogs and apes not only have a degree of self-consciousness, they have quite complex value systems and experience emotions of rage, affection, and so on."[3]

7) The human being. Language and record-keeping allow us to develop a sense of time or history, and collect and organize information into complex images (interpretations) of the cosmos. Humans not only know, but they know they know; this leads to philosophy and a high degree of self-consciousness. Philosophy and science allow humans, unlike prehumans, to act rationally or futuristically in the world. Humans are interested not only in what is, but also in what ought to be. For good or ill, humans have the mysterious ability called imagination.

8) The organization. An organization is a network of roles (i.e., partial persons). The image of an organization is not a property of the organization, but of the executive and other individual human beings. Each level of image complexity, excluding the level of the organization, "includes characteristics from all the lower levels."[4] "Perhaps the organizational level alone should be regarded as parallel to the human level rather than above it."[5]

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Prehuman Knowledge[6]

At the physical or prebiological or inorganic level, the basic model used is that of a closed system. At the biological level, the basic model is that of an open system, a developing structure with through-put; a living organism obviously has an image of the world. Yet it is also possible to think of a closed system as having an image or proto-image of the world. For example, an oxygen atom knows how to join with two hydrogen atoms so as to make an H_2O (water) molecule.

A biological organism is composed of complex parts involved in the ongoing process of metabolism or through-put. But also its development is equifinal: its development stops when it reaches maturity. Its biogenetic structure acts as an image, providing not only the blueprints but also the carpenters. That is to say, the through-put is both material and informational. Material plays a zero-sum game, as it must obey the laws of conservation of matter and energy. However information may play a positive-sum game, not being limited in the same way as materials. "What the student gains the teacher does not lose. . . . In this phenomenon we find the key to the mystery of life."[7]

But the biogenetic structure not only copies itself (the genotype) but also produces the phenotype, quite a

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different matter. The biogenetic structure is an authoritarian teacher, and it learns only by revelation (biogenetic variation or mutation), not from experience. Wrong revelations die. "This gives an appearance of adaptation to the genetic structure. It is, however, purely an appearance and has no basis in reality."[8]

The phenotype has its own image, different from the genotype's image of the world. It has its own messages and its own value system. At the animal level, the messages are no longer limited to chemical communication. Communication in animal organisms is also by electrical or electromagnetic messages. This is "a movement from the strictly atomic level of message bearing to a subatomic level, . . . an enormous increase in the possibility of receiving, transmitting, storing, and organizing information."[9]

With the development of the animal brain cortex, self-consciousness and learning from experience arise and make for a complex and flexible image of the world. We can think of the brain as a hierarchy of interacting centers from the nonconscious reflex or instinct centers to the higher centers which allow humans to engage in higher mathematics or philosophic reflection. A major difference between human and prehuman animals is that communication among prehumans "is in signs, not in symbols. That is to say, the effect of the message on

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the image is to change the image of the world around, not to create an image of nonexistent worlds."[10]

If we were to define self-consciousness as having an image of one's image, requiring a universe of symbols (as distinguished from signs), then apparently prehumans are not self-conscious. "When I hear someone speaking to me the noise of his words is a sign . . . of his presence . . . If, however, he is talking in a language I understand there are symbolic changes in my image, changes which refer not to the immediate universe around me but to the whole content of my imagination."[11] "The study of man is the study of talk. Human society is an edifice spun out of the tenuous webs of conversation."[12]

Human Knowledge[13]

The human image, a human person's knowledge structure, is "'beyond what words can utter.'"[14] Yet, Boulding continues, it is possible to abstract ten dimensions of the human image of the world, as follows:

1) The Spatial Image--or, the spatial dimension of a human's knowledge. With the apes, humans inhabit a space of three dimensions. The ancients lived in a three-story cosmos. Modern astronomy "has, perhaps, deflated his [i.e., human] self-importance, but it has led to serious problems in his prevailing religions, most

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of which are phrased in terms of an unsophisticated cosmology."[15]

2) The Temporal Image--or, the temporal dimension of a human's knowledge. With a sense of history and the invention of writing, "the tendency for the time concept to become linear and for history to be viewed as a one-way street, is almost universal."[16]

3) The Relational Image--or, the relational dimension of a human's knowledge. The relational image of how things work, of regularities, of how things are related to each other, varies from one culture or subculture to another. With the rise of science, the relational image became more complex.

4) The Personal Image--or, the personal dimension of a human's knowledge. This dimension may be viewed as one aspect of the relational image. One has a picture of how things work in the area of personal relationships, the world of persons, roles, and organizations, and of one's place in the personal world. For example, one can think of alternative futures for oneself, for others, or for one's society.

5) The Value Image--or, the value dimension of a human's knowledge. "We now know that what used to be regarded as primary sense data are in fact highly learned interpretations. We see the world the way we see it because it pays us and has paid us to see it that

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way."[17] Accordingly, incoming primal messages, whether sensory or symbolic, may be ignored. Boulding also notes: "The obsession of the poor, both individuals and societies, with material things, may be merely a reflection of their scarcity and not a reflection of a basic difference in value orientation."[18]

6) The Affectional Image--or, the emotional dimension of a human's knowledge. This dimension is related to the value image. It is not one's emotions, but one's value image of one's emotions, which directs behavior. "Man is deeply ambivalent between his affections and his values, and what is more, he values this ambivalence."[19]

7) The Conscious-Nonconscious Image--or, the consciousness-unconsciousness-subconsciousness dimension of a human's knowledge. At any given moment, one is conscious of only a small bit of one's image of the world. By scanning the unconscious, however, one may recall other bits of knowledge. Boulding describes the relationship among the conscious knowledge, the unconscious knowledge, and the subconscious knowledge which make up a human's image of the world, in the following way:

> Freud has made it clear that in addition to the conscious and unconscious parts of the image, there is also a vast area of the subconscious. This may be defined as that part of the unconscious image which is not available by the scanning process and what cannot be brought into conscious view by any simple

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> act of will. The mind of man is a vast storehouse of forgotten memories and experiences. It is much more than a storehouse, however. It is a genuine image affecting our conduct and behavior in ways that we do not understand with our conscious mind. It is one of the main objects of psychotherapy to bring the subconscious into consciousness or at least into the unconscious where it can be recalled at will. Only when our whole image, as it were, is capable of being spread before us, can we organize it as a unit.[20]

Boulding continues:

> The recognition of the existence of the subconscious image enables us perhaps to integrate the rational with the irrational. We can now see all behavior as governed by the image and its value system. Rational behavior is that which is governed by the part of the image which is accessible to consciousness. What is usually called irrational behavior, in fact, follows the same principles. It still consists in contemplating a set of future alternatives and the corresponding acts and selecting the highest of these on our value scales. In the case of so-called irrational behavior, however, both the expected consequences and the value scales may be hidden in the subconscious.[21]

8) The Certainty-Uncertainty Image--or, the certainty-uncertainty dimension of a human's knowledge. One has a sense of relative certainty about some things and of relative uncertainty about other things.

9) The Reality-Unreality Image--or, the reality-unreality dimension of a human's knowledge. This dimension is related to the certainty-uncertainty image. According to the (typical adult) human's image of the world, real things do not cease to exist just because we are not there; on the other hand, dreams, unicorns, and legends are not real, do not exist apart from the human image. "The reality-unreality dimension is quite

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independent of the philosophical question as to whether in fact there is a real world outside our perceptions. Reality or unreality here is a property of the image itself."[22]

10) The Public-Private Image--or, the public-private dimension of a human's knowledge. Some knowledge (i.e., some aspects of one's image) is private (unshared) and other knowledge is more or less shared with others. One may be somewhat conscious of the shared aspect of one's image. What it means to be an American is one example of a shared or public image.

Humans engage in lifelong learning, but the adolescent period is especially important, according to Boulding. Most critical of all, however, is early childhood. Aging and death insure turnover in a society. Cohorts of a subculture tend to have similar images. Thereby the stock of images in a society changes with the turnover of the generations. The existence of organizations promotes and structures the sharing of images. One has an image of one's role in the organization; one's role image tends to be more important than one's image of the organization.

Unlike the case for bio-organisms: "It is the cell [the individual human person] which has the image, not the organization. The image structure lies wholly within the frames of the individuals composing the organiza-

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tions. It does not lie in the relationships of these individuals."[23] "[Primitive man's] picture of his society, however, is an unself-conscious one. . . . A visiting anthropologist, on the other hand, has a self-conscious image of the same society and even of his own society."[24] Social self-consciousness speeds up the rate of change. Nationalism is an example of a kind of partial social self-consciousness. Full social self-consciousness is corrosive to extreme nationalism.

Public Knowledge[25]

One's image interacts with one's society. A public (shared) image is the basic integrative force which binds society together; society tends to protect its (public) image. A public image tends to produce a record or transcript or story or history which it passes down.

A map is a kind of transcript or public image. I have never set foot in China, yet I am certain of China's existence. A map's authority is greater than that of sacred scripture. If a map is incorrect, there is immediate feedback.

Nationalism tends to produce war. "One of the main purposes of national education is to distort the image of time and space in the interests of the nation."[26] It is possible to travel to China, but not possible to travel back in time.

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Much of one's relational image is based on a transcript or public image. Due to lack of feedback, a transcript may be wildly inaccurate. Moreover, a transcript or public image selectively interprets feedback. Fortunately, science is explicitly aware of this problem: The relational image of science therefore tends to be more accurate than other (public or shared) images. The price science pays for this presumed accuracy is an exclusion of much of reality.

Persons tend to see themselves as others see and treat them. Formal education and public ceremony provide payoffs or feedbacks or reinforcements. However the values of one's peers are especially influential in personality formation. Subconscious value systems can be dangerous to one's personality formation. "Of all the parts of the image the value system is most likely to sink into this underworld [the Freudian subconscious] where the scanning focus of consciousness cannot penetrate except at twenty-five dollars an hour."[27]

As we look at the various public (shared) images of a given subculture as they have developed over the centuries, there seems to be a growing pattern of sophistication. This is true, for example, of "mathematics, the purest form of the relational image."[28] The sophistication is due both to symbolic messages (as the transcript develops from within) and to

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messages from nature (so urgent not to be ignored). "Curiously enough, it is often the most successful images [Islam; Marxism] that become the most dangerous. . . . As the world moves on, the image does not."[29] Our long term evolutionary hope, then, is not based on any single branch of the tree of knowledge, no matter how previously successful. Rather, may there always be a growing branch or new shoot: "If one shoot dies another takes over."[30]

Knowledge of Knowledge[31]

In the absence of faith in the possibility of an integrative knowledge of the human knowledge structure, "Freud is completely incomprehensible."[32] Accordingly, and as previously described, Boulding names a new science: Eiconics seeks to develop an organic theory of the knowledge structure. The notion of an image-message relationship, Boulding believes, holds great integrative potential. Boulding declares psychoanalysis to be highly eiconical, even if lacking in generalizable findings. On the other hand, economics is highly generalizable yet also highly mechanistic rather than eiconical or organic. According to Boulding, eiconics is both eiconical and generalizable.

The human person has "knowledge" (i.e, an image) of the world. What feedback is permitted is a function of the image, conscious and nonconscious. The feedback

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consists of messages. Messages may be characterized as internal or external; additionally, messages may be characterized as symbolic messages or messages from nature. Learning occurs when messages modify the image.

The (typical adult) human image values logical consistency, but it also values such nonlogical things as elegance or beauty. The image seeks order and meaning. Some (conscious or nonconscious) "faiths" or hypotheses give the appearance of working or of being useful in some sense. For example, one may nonconsciously posit as a working hypothesis that other things exist beyond, or separate from, oneself. Likewise, one may come to have faith in the proposition that an entity may look one way one time, appear another way another time, yet be the same entity. We learn to disbelieve our chaotic or raw or primitive sense impressions in favor of patterns of order and meaning.

Accordingly, neither "Facts" nor "Values" are known to us. Instead, there are "messages filtered through a changeable value system."[33] "When an object apparently increases in size on the retina of the eye, we interpret this not as an increase in size but as movement. Indeed, we only get along in the world because we consistently and persistently disbelieve the plain evidence of our senses."[34] Our facts and values, therefore, are the

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result of construction or interaction, not stimulus-response or cause-effect.

> As every good teacher knows, the business of teaching is not that of penetrating the student's defenses with the violence or loudness of the teacher's messages. It is, rather, that of co-operating with the student's own inward teacher whereby the student's image may grow in conformity with that of his outward teacher. The existence of public knowledge depends, therefore, on certain basic similarities among men. It is literally because we are of one "blood," that is, genetic constitution, that we are able to communicate with each other.[35]

Each subculture shares a universe of discourse, a form of life, a public image. Public (shared) images of many "folk" and class subcultures are not well verbalized or explicitly stated, however. On the other hand, some subcultures (religious; professional; intellectual) tend to be rather articulate in verbalizing or explicitly stating the subcultural image.

The formal religious image tends to be more stable over time than the informal religious image. Religious literature or scripture provides that stability. The professional subcultures oppose price cutting within the profession and favor educating only a select few into the mysteries of the craft. Keeping professional mistakes hidden from public view is also part of the professional image.

Today the intellectual subcultures tend to share the universe of discourse called science, and be characterized by disciplinary specialization. The

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intellectual image values writing and verbalization skills, the collection of data, and obscurity or incomprehensibility. Wit, clarity, and large body movements while delivering a public speech are frowned on.

The knowledge explosion and disciplinary specialization make it impossible for one person to encompass all intellectual activity. Each department has its own language and image. The same word (e.g., "species") means different things depending on the specialization. Nevertheless, perhaps someday a unified image encompassing all of the intellectual world will emerge. At present, each discipline tends to disregard the other disciplines and also disregard the outside world. Boulding says we owe "an enormous debt to those marginal men who live uneasily in two different universes of discourse. Society is apt to repay this debt by making them thoroughly uncomfortable and still more marginal."[36] As the cultures of the world become less isolated, the intellectual subcultures become more so. "As long as a subculture is isolated from the rest of the world, with all its lines of communication lying within, its image tends to be self-supporting and self-perpetuating."[37] Eiconics, the science of the image, seeks to overcome this isolation.

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Economic Knowledge[38]

Economics is the intellectual subculture Boulding knows best. What, Boulding asks, is the public image shared among economists? According to the economist, the human person is conscious of how things work and, accordingly, what alternatives are available. Secondly, the human economic person ranks all the alternatives on a scale of value. Finally, the best alternative is selected; this is called, by economists, "maximization."

What does eiconics have to say about this image shared by economists? Boulding points out that our relational image of how things work is faulty. Moreover, "we are not even sure what we are uncertain about."[39] More specifically, the unpredictability of the market should make us even more uncertain. Accordingly, a person may be more interested in stability (in the face of uncertainty) than in maximization.

Eiconics suggests, then, a revision in economic knowledge. "This leads to the first revised law of economic behavior: we will do today what we did yesterday unless there are very good reasons for doing otherwise."[40] "The second revised law of economic behavior is that the good reasons which are necessary if we do not do today what we did yesterday are derived mainly from dissatisfaction with what we did yesterday or with what happened to us yesterday. . . . At some point

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the misery in the contemplation of the habitual behavior overcomes the uncertainty involved in contemplating any other kind of behavior and we make a reorganization."[41]

Beyond this, new messages may modify our view of what the alternatives are. The new array of alternatives may lead one into relative optimism or pessimism. But "it is not the message that is important but the transformation of the image which it produces."[42] And messages which previously would have been ignored, may now be interpreted pessimistically by the newly formed pessimistic image. Some value images favor experimentation, others prefer stability.

Political Knowledge[43]

Economics studies wealth, political science studies power. But political power does not follow a mechanistic model. Perhaps eiconics can help develop a theory of political process.

Some roles are more powerful or influential than others. As a first approximation, let us look at roles in two kinds of model organizations--authoritarian and democratic. Perhaps the optimum organization is between the two extremes; "there is some optimum degree of feedback from the lower to the higher roles."[44]

An authoritarian organization eventually disintegrates, for over time the higher roles become more

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and more out of touch with the lower roles. Likewise a democratic organization eventually disintegrates, for over time the higher roles are unstable. Boulding suggests that a practical or moderate democratic politics would realize the importance of decision-making based on expertise and on genuine mutual dialogue, with some value being placed on a convergence of images of the organization. Mutual modification of relational and value images seems especially important. Decisions should be viewed as temporary in nature. For example, "a majority decision is simply a setting of the terms under which the minority continues the discussion--a discussion which presumably goes on forever."[45]

In the long-run, power requires skill in order to maintain itself. Of course the powerful may have a monopoly on the gaining of expertise. This includes, for example, access to formal education, informal learning of elite mannerisms as a matter of course, and the know-whom of the golf course or of the old-boys or existing-power network. The present and future, however, seem to call for not only skilled leaders but also for skilled societies: "such a society would seem necessarily to be based on extensive discussion, accurate feedbacks, a network of mutual information channels, and an absence of coercion."[46] Boulding also points out that skills or

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"images which are useful in gaining power are seldom useful in exercising it wisely."[47]

The value image (contrary to the mechanistic model of classical economics) usually consists more of a general posture or attitude rather than a rank ordering of numerous alternative futures. Such a general posture may be summarized by a single symbol, such as the Crucifix. At present, the flag of a nation-state may serve as a politically powerful, if pathological, symbol. Indeed, the nation-state image "is the principal threat to the survival of our present world."[48] In a political election between Bob and Mary we may tend to simplify it into a battle between good and evil. But in fact Bob and Mary are highly complex entities.

Depending on the images two business-firms have of self and other, competition may lead to either price warfare or price stability. This war-stability alternative also applies in the case of nation-states. In the midst of an arms race or price war, the "security of one is the insecurity of the other."[49] The war-peace cycle and the business cycle are not, then, entirely dissimilar. Whether in international politics or in domestic economics, there are periods of getting better and of getting worse, of a sense of security or of insecurity. Boulding believes that in general "the more complex and extended the image possessed by each nation

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of itself and the others, the less likely are we to find vicious dynamic processes of the arms-race type."[50]

> The problem of discovering the appropriate institutions which will guarantee benevolent rather than vicious dynamic processes in international relations is still very far from being solved. Nevertheless, if we think of it in these terms, rather than in the formal terms of protocol, constitution, and procedure, we will be that much nearer a solution. . . . We still await the larger symbolic image which will unite us all.[51]

Historical Knowledge[52]

Behavior is based on the image. Yet it is not the case that the consequences expected as a result of this behavior will necessarily be the same as the consequences perceived via subsequent messages. So to what extent, if at all, is history under the control of individuals or of societies? Are there some historical processes in our control and others not? Although it should not be forgotten that specifically historical or societal forces are not entirely unrelated to physical and biological processes, are there any specifically historical processes wholely within our control?

The answers to these questions are somewhat uncertain and for optimum behavior should perhaps in some sense remain uncertain. Nevertheless we should want to proceed as far as we reasonably can, both in clarifying these issues and in controlling, influencing, or making history for a better future. The eiconic question here

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seems to be to what extent there are processes in history which act wholely independently of whatever images may be held by individuals and societies (called by Boulding "latent" processes), and processes in history which wholely depend on the existence and structure of images held by individuals or organizations (so-called "manifest" processes).

It seems difficult to find any specifically historical process which is clearly independent of the images held. Of course fundamental physical processes are assumed to be independent of historical processes, or to have existed prior to historical processes. "If we jump off a skyscraper, no matter how elevated our thoughts on the way down, they will hardly affect the rapidity of our descent or the consequences at the bottom."[53] Likewise for biological processes--say, the development of a bio-organism from conception to birth to maturity to death.

Although history does not appear, then, to be very mechanical--still perhaps we may locate rationalistic models which will provide some partial explanations or insights, rather than certain predictions. The Malthusian model of population growth is such a rationalistic system; it is not either a dynamic or evolutionary model. Another only partially enlightening model might be constructed on technological development

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and its effects. "Once a ship could go three thousand miles in an approximately straight line the discovery of America was practically inevitable."[54]

Yet, Boulding continues, Columbus had a relational image of a round world and a value image of profitable spices. "In a society in which the image of progress does not exist, even if technological improvements are made accidentally or are made by the mavericks and eccentrics of the society, they will be suppressed and not imitated. . . . Mechanistic explanations of historical processes are only satisfactory if the intervening images can be neglected as stable."[55]

On the second question ("Are there specifically historical processes which are dependent only on the images held?") Boulding again suggests that perhaps about the best we can do is to construct rationalistic models with their resulting unreliable predictions. Here, however, one may be speaking of a conscious or a nonconscious image, or, at the organizational level, so to speak, of social-selfconsciousness or lack thereof. The arms race and falling in love may be characterized as examples of the rationalistic model of the self-justifying image. But again, this is a partial explanation: "Both trust and suspicion justify themselves up to a point, and then are reversed."[56]

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Columbus discovered America, but he thought it was India. "The person or the nation that has a date with destiny goes somewhere, though not usually to the address on the label."[57] An image of the future which is not subject to feedback and is internally consistent, even eloquent and beautiful, may have great persistence and power in history. One is more likely to change history if one thinks one can change history. Boulding wants to change history while doubting blueprints for doing so. Perhaps Boulding is not being inconsistent here: "The searchlight of the manifest makes more apparent the darkness of the latent beyond it. What this means in practice is that our response should be always to an uncertain image. We should not put all our eggs in the basket that happens to be around at the moment. In the jargon of the economist, our image of history should never be so free from uncertainty that we feel we can afford to dispense with liquid assets."[58]

Knowledge and Truth[59]

At times Boulding the eiconist uses the terms "knowledge" and "the image" somewhat interchangeably: What we know today may be falsified (or apparently falsified) tomorrow. On the other hand, some philosophers have been known to use terms like "knowledge" and "truth" in a more absolute or less

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ephemeral way. (How can you be said to know something if it turns out not to be the case?) Eiconics in Boulding's view is science, not philosophy, although it is possible to do philosophy of social science. Eiconics therefore uses its terms within the scientific, not the philosophic, universe of discourse. (One is almost tempted to call eiconics generalized science, with an eye on the unpromised land of philosophy.)

Yet Boulding is sometimes willing to step from the beach of social science and attempt walking on the water (or quicksand?) of philosophy. He is willing to ask if eiconics and philosophy may cooperate. Boulding asks Pilate's famous query--"What is truth?"--but again there comes no definitive reply. First Boulding searches for absolute Truth, then for eiconic truth; and he reports his tentative findings.

Eiconics, instead of studying absolute Truth, studies the image. If eiconics cannot answer questions about Truth, it presumably can answer some questions about the image. "Science might almost be defined as the process of substituting unimportant questions [e.g., about the image] which can be answered for important questions [e.g., about Truth] which cannot."[60] "It is by these deft substitutions that science grows and philosophy is none the poorer for them."[61] The development of knowledge and of science, then, is useful;

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knowledge and science, however, are not necessarily true. Unlike Truth, eiconics is an abstraction.

Boulding however reports his tentative findings in the search for absolute Truth. The science of eiconics has philosophical implications. Since eiconics is itself an image or a knowledge structure, it tends to be friendly or unfriendly toward certain messages and images. According to the eiconic image of the world, the epistemological position known among philosophers as the Correspondence Theory of Truth is defective: "images can only be compared with images. They can never be compared with any outside reality."[62] Boulding likewise points out that the epistemological position known among philosophers as the Coherence Theory of Truth is defective: "the coherence or consistency of the image is simply not what we mean by its truth."[63] Tentative knowledge and final Truth are not necessarily congruent. Moreover: "We have no real guarantee that the 'outside' to which the image is supposed to correspond is itself consistent and coherent."[64] Nevertheless: "We are saved from solipsism partly by feedback, partly by the perception that our image is a public image."[65]

Boulding further reports tentative findings in his search for the meaning of eiconic truth. Eiconic epistemology guarantees us no absolute Truth. Yet <u>within</u> the domain of an image we do speak <u>as if</u> knowledge or

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reality or truth exists and is attainable. Even given the domain or assumptions of eiconics, however, it is not entirely clear what we mean by truth. Nevertheless we seem to have an urge to label an image true or false, and believe that discourse with ourself or another may lead us toward truth. Whether or not we finally choose to give up such an urge or belief or faith, we can still ask Humean questions about the philosophy of eiconics: Again, even given the eiconic assumptions unquestioned, what would an eiconist mean in claiming an image to be true or false? That is, even within the domain of the science of eiconics, one way ask the philosophic question "What is truth?" or, more precisely, "What is eiconic truth?" Boulding suggests, and then rejects, several meanings of eiconic truth.

There is, for example, what philosophers call the Boo-Hurrah theory. If your image disagrees with mine, then your image is false ("Boo"); if your image agrees with mine, then your image is true ("Hurrah"). The same kind of argument can be made if we use the public image of my subculture as the standard. In each case, however, it is not nonsensical to ask if the image, private or public, may be defective.

So perhaps we will want to argue that the test of truth is survival--either survival of the image or survival of the organism holding the image. Yet there

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are indeed times when ignorance is bliss or has more survival value; sometimes lies survive and truths die. Perhaps the images with the greatest survival value, even if contradicting each other, are not subject to feedback: Much literary, including religious, knowledge is scarcely subject to great falsifying feedbacks.

Indeed, knowledge of science and technology (in the form of nuclear missiles) may prove to be the cause of the extinction of the human species. Accordingly, we may wish, instead, to speak of truth in terms of development. The public image develops over time and is not immune to feedback. Perhaps this is even more true in the case of the intellectual or the scientific image, which consciously builds and also consciously falsifies. Yet it is possible for images to be congruent with, and not be falsified by, the known relevant messages--and yet the images are inconsistent with each other; they may, every one, not be true.

Perhaps, then, some source of authority guarantees the truth? "The graduate student who confirms, in a new way, the images of the professors is praised for his originality. The one who denies the sacred images will in general, not be awarded his degree."[66] Is there no such thing as truth? Does the philosophy of the science of eiconics, then, lead to philosophical skepticism?

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With Hume, "we draw back horrified, incredulous at incredulity."[67]

Perhaps, indeed, eiconic philosophy is unable to define eiconic truth. "We can only say that there are elements [faiths] in the image which are capable of organizing the life and activity of the individual. . . . Faiths [e.g., in Science or God or Reason or Nation] are the genes of society."[68] Eiconics, then, is congruent with many different faiths ("organizing images") even when the faiths are incongruent with each other.

Yet obviously eiconics is not devoid of philosophical implications. For example, messages are relevant both to the image's facts and to its values. "The theory of the image is distinctly unfriendly to the position that facts and values are quite distinct, that facts are a proper subject for scientific study, whereas values are not, that facts are objective and values are subjective."[69] From the eiconic point of view, the important distinction is that between messages from nature and symbolic messages. (For example, a message of pain is important both to the factual or relational image and to the value image.)

Indeed, it is the image's value system which acts as a gatekeeper of the (conscious and nonconscious) messages--whether the messages be internal or external, whether the messages come from symbols or from nature.

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The value system of the image helps determine the structure or nature of future growth and development of the image. (This includes both the factual or relational dimension and the value dimension.) From our previous inquiry into truth we have tentatively concluded, Boulding says, that science can validate neither facts nor values. At the same time, Boulding places high priority on the development of normative science, the scientific study of values. And no doubt Boulding considers it important to integrate factual science with normative science, presumably with assistance from eiconics. "We can examine consistency, coherence, survival value, stability, and organizing power [the power of faiths or organizing elements] in the image, because the image can investigate the image. We can never examine the correspondence of the image with reality, whether in the field of value or in the field of fact."[70]

Eiconics, the science of the image, is an image which finds certain philosophical positions especially friendly: Eiconics

> leads in the direction of a broad, eclectic, organic, yet humble epistemology looking for processes of organization rather than specific tests of validity and finding these processes in many areas of life and experience: in art, religion, and in the common experiences of daily life, as well as in science. It is least friendly to those philosophical positions which put all the eggs of truth in one basket of method, whether that of experiment or of revelation. It seeks truth in a way and a life, or perhaps, in

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> many ways and in many lives. It emphasizes communication and feedback as the great sources for orderly and organized growth; thus linking hands with both cybernetics and semantics. Most of all, perhaps, it brings the actor into the act; it looks beyond mechanism without falling into vitalism.[71]

Knowledge and Education

According to Boulding, the task of education may be characterized as the task of knowledge increase.[72] Due to death and forgetting, the stock of knowledge may decrease. Likewise, formal schooling may teach some that they are unable to learn.

Boulding is willing to allow, as an imperfect first approximation, that the more schooling one has completed, the more knowledgeable one is. Moreover, a society is more knowledgeable if there are a wide variety of specialists, rather than everyone knowing the same thing. Boulding believes it is clearly feasible, should educators or economists so decide, to measure the simultaneous increases and decreases in a society's knowledge stock. He means measures comparable to GNP and other economic statistics. Boulding considers such gross measurements to be both dangerous and useful. Moreover, interdisciplinary cooperation and communication among specialists would presumably add to our stock of knowledge and its practical use even further.

The technology of writing has proven to be a most useful educational invention; even when authors die,

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their works live on. Science is a more recent social invention. In the sixteenth century, China was most advanced, yet it was Europe which took up science. It seems that there is something good to be said for the tensions, inefficiencies, and chaos of the European Renaissance and Reformation.

Precisely what science is, and why (so far) it has been so useful may not be altogether clear. But in (the value image of) science, truth-telling has priority over the pressures of either power or politeness. Science also emphasizes feedback (testing) over kneel-down (authority). Science too is interested in the outside world, in this world, rather than in feeling good subjectively or in a religious or philosophic world beyond this one. Likewise, esoteric instrumentation has been yet another driving force in the advancement of science. Such scientific instruments include the telescope, the microscope, and statistics.

Knowledge now appears to have a dynamic or impetus of its own. Yet there are limits to the knowledge explosion. Whether there are any ultimate limits to knowledge, no one knows for sure. But, regardless, there are limits. No one, for example, expects that tomorrow we will find that there are five major hemispheres (or only one major hemisphere) in the typical adult human brain. Tomorrow we do not expect to discover on the

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planet Earth yet another major continent beyond those now known; Earth's surface, at the human-size level of knowledge, has been mapped.

Likewise, there are few, if any, additional human cultures yet to be discovered on the planet Earth. There is a limit here. Again, there is a kind of limit in knowledge of human history; humans have existed only within a limited (not infinite) window of time on planet Earth. Today we are able to see or visualize Earth's geography in its roundness, human culture as a disciplinary unity, and all of human history as a whole. There is a level of knowledge of Earth's geography, human culture, and human history which we know is not infinite, thereby offering the prospect of seeing each one whole, just as we already have global geographies of the planets Earth and Mars.

It is not ultimate reality, but accessible reality, into which knowledge expands. Ultimate reality may be infinite, accessible reality finite. Therefore, there may be ultimate limits to science. If there are such limits, they are presumably far off. On the other hand, there may be nearer-term limits to education, even when much accessible reality yet remains. While knowledge has exploded, death and forgetfulness have remained; on this basis alone, over one percent of all human knowledge is lost per year and must be replaced. The sheer

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reproductive or maintenance function of education may become a greater and greater burden if such circumstances or trends continue. This makes it more difficult for the stock of knowledge to increase, even when much additional reality yet remains potentially accessible. If today one aged 25 years is ready to tackle the frontiers of knowledge, will tomorrow 50 years be required before one reaches the frontiers?

Is, then, an equilibrium in our knowledge inevitable? Boulding maintains that we can use our knowledge and creativity to postpone such a state of affairs. Perhaps this postponement is what evolution is up to. Such improvement of education, then, may be on the side of the angels and part of a secret evolutionary plan. Dissatisfaction with education may have many sources, including the one just mentioned rooted in the sheer magnitude of the knowledge explosion itself, the maintenance function of education. Educators should invent new social technologies with this in mind. Educators, like all inventors, must be prepared to make many mistakes. Real science, not the quasi-science of pure empiricism or data-gathering, would seem to be the more fruitful approach to social-educational invention.

Education (knowledge increase) must concern itself with both scientific and nonscientific knowledge; it must also serve as a bridge among all the intellectual

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subcultures or disciplines.[73] Science may be divided into the physical, biological, and social sciences. Science is successful because it abstracts, locating hidden relationships in the complexity of reality. Such simplifications can be very useful--but it is important that scientists, especially social scientists, be aware of the dangers of mistaking an abstraction for the actual organism or person itself. Simple mechanical models explain the behavior of hydrogen better than the behavior of humans. Human persons, however, have an inside track on what it means to be a human person; this knowledge (e.g., the plays of Shakespeare) we identify with the humanities rather than with the sciences. Social science may be viewed as a bridge between the humanities and the sciences. Science prefers to live in a world of repetitions and abstractions; the humanities attempt to deal with uniquenesses and phenomenologies.

The so-called economic man of classical economics is an example of a scientific abstraction: Instead of human persons, we here have calculating decision-machines. Nevertheless, the usefulness of scientific simplifications is not limited to school success in passing examinations. A new field of study called game theory, which includes decision theory, attempts to deal rationally with the fact that decisions may be made in the face of uncertainty rather than certainty. One

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theoretical difficulty here is that different persons, and perhaps different situations, seem to require different notions of the standard of rationality. Introducing a second, or even a third, person into the game complicates matters even further. In such a complex world, the branch of decision theory called operations research, which attempts to substitute mathematics for intuition, may prove helpful or fruitful.

Good mental health is not usually identified with any and all standards of rationality whatsoever. Whether or not a mentally healthy person may be characterized as having flexible standards of rationality, flexible as called for by the relevant situation, Boulding suggests that one may make a distinction between two kinds of educational or mental systems. Buridan's ass, in philosophical terminology, stands undecided between two equally desirable bales of hay; Boulding points out that in this dynamic system there is in practice a resolution to the difficulty: The donkey eats (in good health) one bale, perhaps then the other. But "Boulding's ass," so-called in the present investigation, stands (in poor health) between two equally repulsive skunks; this system is stable, without a resolution to the difficulty. Buridan's ass moves toward the good; Boulding's ass moves away from evil. The results (healthy disequilibrium or unhealthy equilibrium) are not the same, but then the

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situations are perceived to differ. Boulding claims that according to his new science of eiconics, a person's general tendency is to move toward good rather than away from evil. According to Boulding, the eiconic model, although still an abstraction, is less mechanical and more realistic than many other social science models of human learning and personhood.

Present and future social science may assist us in the prevention of mental illness, economic depression, and international war. Without active and serious dialogue between the sciences and the humanities, science may lead us to disaster. Social science--no, the right kind of social science--can serve as a much needed bridge between the sciences and the humanities.

The images or views held by non-experts have significant impact on the evolution of American society and its educational system.[74] Of course there may be conflicting images; for example, both anti-business and pro-business images exist in American society. We will now look at conflicting economic images among Americans, then consider what is needed in terms of economic education.

Anti-business images include the view that the public interest is to be preferred over the private business interest. Service is seen as better than profit. Working cooperatively together is seen as better

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than cut-throat uncooperative competition. Infracaninophilism (love of the underdog) favors the worker over the employer and small business over big business.

Pro-business images include the view that it is better to be businesslike rather than inefficient. Business is independent, polylithic, and democratic, whereas government requires subservience to arbitrary monolithic power. Competitive businesses are better than monopolies, whether in business or government. Business is interested in service, government in power.

Likewise there are pro and con images of government. In general, however, the government tends now to be viewed as an economic steering wheel, not an engine producing wealth, and not economically indifferent. With democratic government acting as governor and business enterprise acting as engine, perhaps America will become the first classless society--"created by everybody becoming middle class."[75]

To what extent, if at all, are the conflicting economic images testable or verifiable?[76] The question of truth or verifiability is a longstanding philosophical puzzle. Nevertheless we continue to believe in the notions of truth and verifiability. We are convinced that one part of our image is real, another part fantasy.

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The process of testing provides feedback we use to distinguish truth from untruth. It is assumed that feedback somehow has, or tends to have, at least some positive correspondence or relationship to reality. Historically most humans have arrived at the conclusion, usually nonconsciously derived, that there really is an outside world and that other selves, distinct from oneself, actually exist.

We expect or predict something. The future arrives, providing feedback, thus meeting or not our expectation. Formulating the expectation and attending to feedback are learning experiences, yet success does not teach us so much as failure. A successful image is no guarantee of its truth; but an unsuccessful image is necessarily less than fully adequate. Hence the importance of failure: Nothing fails like success, and nothing succeeds like failure.

There are three eiconic ways in which failure may be turned into success. One may choose to look more closely at the message, at the inference, or at the image. In the face of disappointment, we may question the message: The eyes can deceive, the expert can be wrong. (We have a tendency, <u>not</u> entirely justified, to believe, rather than disbelieve, a message when it conforms to our image or prediction.) If our expectation or prediction is a probalistic (rather than an apparently

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certain or necessary) one, we may simply conclude that the unlikely has occurred. (The feedback may not unequivocally confirm or disappoint the expectation.)

On the other hand, we may check to see if the expectation really followed from our image. We may have mistakenly engaged in some fault of logic. (Although mail is delivered Monday through Saturday except holidays, we somehow inadvertently dropped the "except holidays" when actually making the calculation.) But after re-examining the message and re-calculating the inference, to the extent such things may be feasible, we may sometimes finally decide it more likely that the image itself is at fault. Yet, in a manner of speaking, there is yet a fourth way of turning failure into success: Since it may be that many false messages and many false inferences remain yet to be discovered, not necessarily by us, we may sometimes finally decide it more likely that the image itself is <u>not</u> at fault after all. Moreover, there is no absolute guarantee that reality is self-consistent.

Scientific testing follows the same principles, but it attempts to be more rigorous, dealing with repeatable messages and explicitly stated models/images and inferences. Its primary goal is modification of the scientific image, or (scientific) learning. It advances the scientific image by constructing events making for

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strong belief in the messages and in the inferences. In general it is easier to test parts of one's image of the world rather than the whole image.

So-called verifiability may come easy or hard or very hard--or be impossible. A road map, for example, is relatively easy to test: Simply go out in your automobile and see if recent road construction has falsified the old map. Test the price of apples by actually buying some. The fact that many people use roads and eat apples means repetition of the messages and therefore relative accuracy.

The cost of testing is also a factor. And it is hard to test something when the act of testing may influence the results. Although one can eat half the apple and probablistically infer the quality of the entire apple, one cannot absolutely judge the quality of the entire apple until the entire apple has been consumed. Each apple can be tested so rigorously in this way only one time, rather after the fact. Nevertheless we form expectations (often not later disappointed) of what this apple or that one will taste like. We tend to test more when things are going poorly; when things are going well, we tend to believe we are in touch with reality. "Nothing fails like success, especially a misunderstood success."[77] Bankruptcies are rather

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expensive ways of testing. In general, the more difficult the test, the more expensive it will be.

It is very hard to test the tests. And the development of less expensive testing methods is recognized as important. Centrally planned economies lack ample and adequate feedback, and political corruption can destroy the quality of feedback. Fear does not promote quality feedback. But an economic system is very hard to test. Centrally planned economies differ, as do market economies. The ideal may lie in the golden mean, but that mean will vary from one culture to another. One might cite the American economy as one which falls in the mean.

Alternative political structures, democratic or totalitarian, are very difficult to test. The virtue of a democratic system is that some tests (rather than all tests or no tests) will cause disappointment. If totalitarianism fails, as seems likely, the whole structure falls; in any case, with totalitarianism, it seems likely that much more human suffering will occur than is necessary on the road to human betterment. Here the golden mean may be closer to democracy than to totalitarianism. But success, not just failure, should ideally lead to further testing. No matter how successful, we should always actively seek a better way.

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Much which falls under the rubric of religion or ideology is impossible to test. Perhaps there is a need for untestable certainty. If so, perhaps we should find ways to channel this need so as to cause the least harm.

If something is truly random, then any non-random image of it is superstition. We may think that something was predictable or foreseeable when in fact it was not. Both pigeons and people can act superstitiously. Social systems are a mixture of randomness and non-randomness, and it is not easy to sort out one from the other. Failure of prediction in a social system may be the result of randomness, not lack of knowledge. At this early stage, however, it seems reasonable to suppose that we do lack knowledge potentially available. Data collection and data processing are important first steps in most any new field of social science. Such data allows us to exclude at least the wilder speculations, whatever that data comes to define "wilder" to mean. Sampling and data collection over centuries may suggest patterns invisible over a period of 50 or 100 years.

The increase of economic knowledge is a significant factor in our economic growth since World War II, in contrast to our post-World War I condition. The economic problem of how a less developed country in today's world can become a more developed country is a far more complex matter. The advancement of such developmental economics

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should receive priority funding despite the distinct possibility that it may yield no immediate fruit. The stakes for the world are high.

The education industry constitutes a larger proportion of the American GNP than agriculture.[78] Yet there are many more agricultural economists than there are educational economists in the United States. American education belongs substantially in the public, not private, sector of society--and in the grants, rather than exchange, part of the economy. This does not excuse our lack of interest in educational economics, despite the fact that accurate measurement of education is difficult, compared with the concreteness of apples and oranges.

It is taxpayers--even a certain subset of taxpayers--who pay for public education, meaning that the education industry operates in a politically charged environment. An economist is tempted to view knowledge or information as a commodity like apples or oranges. Some apples cost more than others, and some knowledges are more valuable than others. We have to decide what old knowledge to maintain (the teaching function) and what new knowledge to produce (the research function). These may be characterized as economic decisions, or choices under constraints. The struggle over the

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curriculum, then, may be viewed as an economic problem, i.e., a problem of scarcity or finiteness.

Scientific description suggests the need for standardized terminology. This is relevant if we wish to view teaching in a scientific perspective. There are many kinds of teaching and of learning, but this has been little studied, due in part to lack of a common vocabulary. The central notion for our new vocabulary, however, is learning rather than, say, formal schooling.

The social process in a society teaches persons attitudes and values. When a society fails to teach the right kinds of values, the society fails and perhaps falls. "We have to think of formal education indeed as only one among many instruments and inputs which affect the total learning process in the society."[79] "If it [formal education] is isolated, it is in grave danger of becoming a self-perpetuating process for transmitting 'trained incapacity.'"[80]

Given a sufficiently large growth in the explosion of knowledge: "unless we devote the cream of our intellectual resources to the problem of economies in the transmission of knowledge, that is, to education, we may find the whole growth process grinding to a halt."[81]

> There are some areas of knowledge which it is agreeable to have, but which are not of great significance for human survival. An accurate and workable image of the social system in general, and the economic system in particular is, however, increasingly essential to human survival. . . . The

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> more complex society becomes the more important it is to have a widespread realistic and complex image of it. . . . Then whoever is thrown by our political Monte Carlo processes into powerful roles may reasonably be expected to have realistic images, and will make good decisions. Economic education, therefore, along with education in other aspects of the social system may well be one of the most important keys for man's survival in the coming centuries. . . . To be effective, it must be widely disseminated. The study of dissemination, therefore, and its impact on the total social process should have a very high priority.[82]

Let us now look more closely at the question of which knowledges or leanings are more valuable.[83] This entails becoming conscious of our values and the possibility of modification of our value image. The perspective of eiconics may prove helpful in our exploration of this question.

We may suppose that the value dimension of our view of the world is made up of "various ordering systems by which the parts of the [relational image, or the] field of the image are ranked."[84] Moreover, the various ordering systems are subject to ordering by a dominant ordering or value system. It seems necessary to suppose not only a relational or factual dimension but also an ordering or value dimension to our image of the world: "a mere image of fact will never lead to behavior, but merely to vegetative inactivity in any place where one falls."[85] Indeed, separation of the relational image from the value image is highly artificial, if a sometimes useful abstraction. For example, we learn to see facts;

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facts are (conscious or nonconscious) interpretations, as we know from the testimony of persons blind from birth who then gain sight in adulthood.

If the value image were not resistant to change, we would see the world as a kaleidoscope of inconsistencies. Either too much or too little resistance to change in the value image is mentally unhealthy. Image modification (learning) may be thought of in terms of the sensing of inconsistences. A message may be inconsistent with the image, or one part of the image may be inconsistent with another part of the image. An image may or may not place a high value on sheer logical consistency. One can think of aesthetic sensibility as a higher form of consistency or logic. Moreover, if a perfect image is unavailable, one then has no choice but to choose (consciously or nonconsciously) an imperfect image or perhaps even more than one image. Indeed, reality may be imperfect--neither logically consistent nor aesthetically pleasing. Under stress a person may revert to the basic biological values, forgetting the higher non-biological or symbolic learnings.

It pays us to see the world in terms of space and time; if we do not, we experience pain. The external world or space-time hypothesis can be useful even if untrue. Both messages and the image both limit and direct one's learnings. Such is the world of rewards

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(confirmations) and punishments (disappointments). In the East they have found it easier to modify the value image than the relational image. Science seeks modification (advancement) of the relational image.

Separation of science and ethics, facts from values, can be disastrous.

> What I am arguing is that on the humbler ground where "truer and falser" in regard to the image relate merely to the pragmatic workability of the image, there are processes of validation even if there is no automatic touchstone of truth, and that these processes of validation apply as much to the value image as they do to the image of fact.[86]

Our belief in a world of objective values, like our belief in a world of objective facts, is based on a leap, an eiconic inference, a faith, a working hypothesis. That is to say, belief (in facts or in values) is not a purely arbitrary matter. The search for relative validity is easier than the search for absolute Truth. Nevertheless, validation of a fact or a value may be difficult or impossible. In general, however, the more widespread a public image, the easier validation becomes, simply because agreement on the image is often an important aspect of the validation process.

Moreover, some images tend to be self-justifying. You perceive me as bad and I treat you badly. We perceive the economy as getting worse, and it gets worse. It is important to set up institutional barriers to going from bad to worse, e.g., so as to prevent another war.

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Subcultures with records or scriptures or written histories may use these records to challenge the present, thus renewing themselves. With an eye on the future, the past challenges the present, and the present challenges the past--so let us

> travel hopefully. It is only proper humility to confess that we know very little about the ultimates and absolutes: it is sheer cowardice, however, to maintain with some modern philosophers that these matters are of no concern to us, or are "nonsense propositions" not worth troubling our minds about. We are not given perfect knowledge, but it is not unreasonable to hope for sufficient knowledge.[87]

According to the intellectual image or subculture, more knowledge is preferable to less knowledge. But, one must ask, what of the economics of knowledge? One cannot know everything. Some things that we know are either unnecessary or not so. Some things only some people need to know, other things everyone needs to know. All of us have cosmic obligations.

What precisely these responsibilities are--i.e., what a liberal education meant for all human persons should consist of--is an important question in these days of the knowledge explosion, the population explosion, and nuclear missiles. What learnings are necessary for all human persons, as we face the twenty-first century and beyond? Indeed, with the prospect of postcivilization in mind, each specialized discipline must ask of what its core knowledge should consist. We must not only consider what we now know, but also what we need to know in the

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future. The present must be directed toward the future; indifference to the future is a value of limited value.

Accordingly, there is a place for planned ignorance as well as for planned knowledge. The value system helps shape the ways in which the image will and will not grow or advance. Unfortunately, each isolated specialization has its own pathological interest in the matter.

> We must come to recognize, however, that the planning of a curriculum is an ethical problem, and that the more clearly this is recognized, and the more earnestly explicit value systems and ethical principles are sought after in this regard, the more likely we are to achieve "balanced growth" (that elusive ideal of the economics of development!) in knowledge.[88]

Education and Learning

Indeed, when we value something, we are not choosing a single value isolated and alone--but a system of values.[89] Our value system may tell us that we need more of this something, or that we have too much or just the right amount. If I am rich, I may not place much value on this $100 bill; if I am poor, I may value the same bill more highly. Moreover, the very same person may be poor one time, rich another. That is, all these "persons" may share the same value system yet act differentially.

A related factor is feasibility; feasibility is part of our value system in terms of our actual behavior. We can think in terms of greater or lesser feasibility,

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or alternative costs of sacrifice. We can, then, think in terms of opportunities and of preferences. A slight change in either our opportunity image or in our preference image may produce large changes in actual behavior. A large window of alternative behaviors may also occur if we are unsure of what is possible or preferable or if we are faced with a dilemma. Two persons or nations may therefore have similar images of opportunities and of preferences, yet engage in radically differing behavior. Our images of opportunities and of preferences are learned, given the biogenetic foundation.

As persons communicate with each other, they tend to form a public image or a common value system. A society refuses to permit certain values. The value systems of individuals, then, "cluster into value constellations much as the matter in the universe is clustered into stars."[90] In one's early development, approval from others is very rewarding. In this way, value systems are reproduced.

Yet one may also learn to more actively or profoundly modify one's value system or one's view of the world. Feedback, including personal conversation, modifies one's image. It is easier to predict future technology than future values. What persons and philosophies of the twentieth century will be valued in the twenty-second century? Most likely their answer will

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differ from the twentieth century answer to this question. As previously suggested, "widening the field of choice through changes in technology may profoundly affect value systems."[91] (This includes the technologies of social-educational invention.) Mobility or transportation provides us with a variety of feedback. Transportation also helps define one's identity. Horses once were the transportation of the elite; today automobiles have democratic influence. Elite powerful centaurs gave way to democratic powerful turtles.

The value systems of the objects in one's environment have much to do with one's success/survival or failure/death. Yet our information system about the value systems of other persons and cultures is highly defective. The international system seems designed to produce propaganda, misinformation, misunderstandings, and disasters. Many of our domestic economic images are also defective. Decision-making would be improved if we developed an information system designed specifically for the creation of more accurate images of matters both domestic and international. Will formal education, in its two-fold function of teaching-learning and of research-development, choose to assist humans in learning how to prevent human extinction and promote human betterment?

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Rote learning is a message, shot into the image (one's mental structure), which sticks.[92] But other messages may cause the image to actually reorganize; this is a higher order of learning. The image, however, is biased against change and for equilibrium. Yet it sometimes only takes one or a few messages to radically reorganize the image.

We may interpret an event as a random or a nonrandom occurrence, and in each case we may be wrong--for a total of four possibilities. Beyond this, these four possibilities stand in a context of payoffs. These basics help direct our construction of our image of reality. If there are positive payoffs for correctly interpreted nonrandom events and no negative payoffs for the other three possibilities, we may tend to treat each and every event as if it were nonrandom. (Many other variations on the payoff theme are possible.) Some societies believe in ghosts, other societies do not. Presumably payoffs have already accomplished much of their work prior to the message reaching the level of human consciousness. Most of the messages which reach human consciousness, therefore, are probably correctly perceived to be nonrandom events; some messages are allowed to receive the designation "fact."

Eiconic theory has implications for 1) validation of facts; 2) validation of values; and, 3) viability

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(organism or organization survival). It is the homeostasis of the organism as a whole, not of the image, which makes the organism viable/survive. Hence the importance of payoffs--the need for (nonconscious) filtering and (conscious) criticism of messages, for modification of the nonconscious image and of the conscious image, even making the nonconscious conscious to the extent this may be possible or feasible.

We develop an image, model, or hypothesis to make sense of the messages: We infer the existence of an external world, that the stick in the water is not really bent, that the size of the object does not really become bigger as we approach it, etc. Our hypothesis, model, or image (conscious or nonconscious) prevents the world from dissolving into chaos. This is useful even if far from ultimate reality. Being raised in any culture at all is better than being raised in no culture at all; a feral human infant is extremely unlikely even to survive. On the other hand, a culture of child-beating can be improved on.

Survival and development of an organism, organization, or species may be explained in at least two ways: 1) evolution or variation-selection; and, 2) redundancy or undercapacity. The evolutionary model is not very predictive; it is mostly hindsight. Redundancy and playfulness have apparently served an important role

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in the course of evolution: "Undercapacity operation in normal times is almost a prerequisite for the survival of crises, and an organization which is too efficient streamlines itself towards the exit."[93]

There are two ways to communicate so as to produce a common subcultural image or core culture: 1) Do not communicate in good faith, e.g., engage in war (violently or nonviolently), a win-lose approach; and, 2) Engage in good faith dialogue, a win-win approach. Research is needed to develop models of "how to transform 'war' into 'discussion.'"[94] An analysis by Shackle suggests that in an uncertain situation we especially take into account the possibility of surprise, rather than looking at mere probability ratios. This insight, combined with game theory, leads Boulding to the hypothesis that in uncertain situations, our learning or at least "our behavior is limited by our fears of the worst rather than by our hopes of the best."[95]

A society should not only be interested in economic development or evolution, but in all forms of evolution or learning--political, artistic, cultural, moral, and so on.[96] Evolution or learning is nonconscious until it reaches the human level. Societal development, like biological evolution, is a variation-selection process. A human mind invents; society may or may not select the invention. Biological species compete for food to

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survive; commodities (one form of nonbiological or societal species) compete for money (their food) in order to survive.

An organism got where it is because it got that way--that is, it survived. This suggests that most genetic mutations are adverse, that most new ideas are bad ideas. Some genetic mutations and new ideas have great long term potential but find it difficult or impossible to survive in the short run.

Books are a tool of knowledge transmission. But books, unlike humans, do not consciously learn, think, or know. Human knowledge, then, deteriorates rapidly due to the short human life span. Accordingly, new means of knowledge transmission (the maintenance function of education) are vital to a society which wishes to continue to evolve, develop, learn. There is a traumatic aspect to properly educating human persons to live in today's and tomorrow's world: "You have to teach people that what they learned at their mother's knee is largely nonsense."[97]

Any society which fails to continually develop new ways of transmitting knowledge from one generation to the next will stagnate. This is because of the heavy burden of expanding knowledge; specialization, for example, was a necessary innovation. A society which stagnated due to a knowledge explosion might find maintenance education

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burdensome, research almost impossible. Accordingly, an evolutionary or learning society is always in need of new ways to acquire and to transmit knowledge.

Some ways of learning are more fruitful than others. The potential of the old ways will be used up unless new ways are invented. Agriculture had great potential for civilization (helping invent such things as intellectuals, specialists, and schools), but now new inventions are needed if we are to achieve postcivilization. In a manner of speaking, then, we want unbalanced growth or learning, rather than a balanced or stagnate approach.

Economics-related teaching-learning and economics-related research-development are needed for proper evolution of our planet.[98] Wealth is necessary for realization of many other moral goods, yet most humans live at subsistence level. The gap between rich and poor widens. Yet another trap to learning our way to postcivilization is political. We can think of Earth's international political system in terms of the interaction of nation-states. Some of these nation-states produce nuclear missiles, raising the question of to what extent a country can any longer be said to have national borders.

The international system exhibits the phase boundaries of war and peace. War is generally considered

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by the world community to be less legitimate today than at the turn of the century; these days "interventions" are preferred to officially declared "wars." Some distinctions are somewhat arbitrary. Other distinctions seem more clear: war-peace; water-ice.

Certification (diplomas and degrees) is both arbitrary and clear-cut. On the one hand, it makes sense to modify certification requirements from time to time; on the other hand, a person clearly is either certified or not. We can think of certification as both arbitrary and clear-cut, and of war as both nonarbitrary and clear-cut. Certainly a person or country engages one set of values in war, another in peace.

The international system is complex. Not only are there many causes of war and of peace, but there are many actors on the international stage. In order to reduce the basics of the international system to manageable or understandable proportions, let us assume two actors and a simple relational image.

We can think of two countries as having a relationship of war or of peace. If two countries have a "strong" relationship with each other, they will tend to be peaceful with each other; if two countries have a "stressful" relationship with each other, they will tend to be warlike with each other. To simplify, we can think of four possible kinds of relationships between

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countries: 1) The relationship is both strong and stressful; 2) The relationship is neither strong nor stressful; 3) The relationship is strong and not stressful; and, 4) The relationship is stressful and not strong. The trick is to move the international system away from position 4 (warlike) and toward position 3 (peaceful). Boulding points out that this model may also be applied to the marriage relationship.

One practical difficulty with the model may be that we can test the strength of the relationship only by supplying sufficient stress so as to break the relationship. This is more feasible with metals or materials than with marriages or nation-states. On the other hand, in the area of education (knowledge increase) and learning (knowledge modification), we must not fall into the trap of doing only the easy. The important may be difficult or impossible; even so, education and learning should not loose sight of the important.

We can think of the phase boundary as involving 1) war; and, 2) peace. Alternatively, we can think of the phase boundaries as involving 1) stable war; 2) unstable war; 3) unstable peace; and, 4) stable peace. (These four conditions have been previously discussed.) Moreover, it may be that the war-peace and the unstable peace-stable peace phase boundaries are discontinuous. However, all of the processes of phase change involve

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learning (image modification). We learn images of alternative futures on which we make a decision. We learn to value one system of values and not another, thus valuing one alternative future but not another. Preferences are learned and we learn to modify them. Images such as self interest, national interest, or world interest change. The "national interest is simply what the nation is interested in, and this is capable of quite sharp variations."[99]

In today's world, a superpower which sees its national interest to be in building itself into a world empire is thereby handicapping itself both economically and morally. Why, then, do countries engage in the pathology of "greatness"? Why, in today's world, has the international system not crossed the phase boundary into stable peace?

The so-called "prisoner's dilemma" familiar to philosophers and game theorists goes far in answering this question. It is a matter of the larger processes of social dynamics.

> If everyone is honest, everybody is better off; if everyone is honest, it pays me to be dishonest; if I am dishonest, it pays everyone else to be dishonest, so we are all worse off. There seem to be only two answers to the prisoner's dilemma. One is the learning of a sense of community . . . The other answer is the development of some third party [laws; mediations; arbitrations; police officers] who will change the payoffs.[100]

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We have, then, one or two general strategies (a strategy or set of strategies) for moving from international dilemma to stable peace. Of what might such a stable peace consist? The attempt by one nation-state to change the boundaries of another nation-state causes stress which may result in war. Such unilateral action is contrary to stable peace.

Alfred Kuhn has suggested that evolution proceeds upward toward complexity for a reason. In biological and in societal evolution, "there is always room at the top: that is, there is always a niche beyond the present structure of niches."[101] Human learning and macrolearning have produced larger and larger areas of stable peace: tribes to cities to nation-states to groups of nation-states (North America since 1870; Scandinavia since 1815).

Some oppose "peace at any price"; others propose "love at all costs." It makes sense for us to engage in research-development for the purpose of lowering both the price of peace and the cost of love. Anyway, we often find after the fact that we have miscalculated, that peace was relatively less costly than we initially perceived. Hence the need for a more realistic international information system.

The history of societal evolution (human learning) suggests that a system of international stable peace is a

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reasonable goal. Although it certainly makes sense to speak of "structural violence" against persons even in a "peaceful" world, Boulding prefers attainable international improvement over unattainable utopia. Education should be aimed at the learning of human betterment. Boulding has criticized the utopian approach "somewhat severely on the grounds that it substitutes a vague and presently unattainable objective, which is the establishment of the ideal society, for a clear and attainable one, which is the abolition of war, and at the present moment this may be a dangerous diversion of attention."[102] Boulding wants us to learn and macrolearn enough, but not too much, world community: enough for stable peace and not enough for world tyranny. In such a world of stable peace, our quest against structural violence should continue.

The Macrolearning of Nations

The dynamics of a system (e.g., a person or an organization) may result in evolution (e.g., learning by a person or macrolearning by an organization).[103] One may use differential equations to categorize kinds of systems. Reducing the state of a system to a "difference equation" of the first degree means we know what today will be like because we know what yesterday was. Reducing the state of a system to a difference equation

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of the second degree means we have to know the two previous states of the system before we know what the present state of the system will be like. If history is viewed as a difference equation of an infinite degree, then history has no laws discoverable by finite beings.

If (accurately) predicting the future of history is impossible for humans, humans can nevertheless look back at history in an attempt to find meaningful patterns. Such patterns may not be insignificant for present decision-making about the future. Futuristics, then, has hope for limited success even if its success is often due to undependable luck rather than to dependable law.

The sociosphere contains many threshold systems, meaning that in certain circumstances a small cause can have a large effect. A system with a high threshold is difficult to detect. Neurons of a brain are threshold systems. Persons in a social system are threshold systems. One firing of one neuron may be below a person's threshold point for making a decision. Information from an alarm clock may be enough to produce the threshold behavior of getting out of bed. A single decision of a single person may be below a society's threshold point for making a societal change.

Human knowledge is a major part of the dynamics of the social system. Moreover, knowledge about the social system changes the dynamics of the social system. It

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seems that human history is determined both by impersonal forces and by human persons. The knowledges or images of persons help direct the course of history. Presumably, however, knowledge becomes more important, more influential on the course of history, as knowledge increases. Without knowledge of the impersonal forces there is no prospect of directing or regulating them. Perhaps most important of all in determining a society's learning (i.e., macrolearning) and behavior is a society's image of the future. Perhaps most important of all in determining an individual's learning and behavior is an individual's image of the future. Some have a short-run image of the future, others have a long-run image. An optimistic image suggests well-organized learning and behavior; a pessimistic image suggests poorly-organized learning and behavior. Accordingly, the image-makers (i.e., human persons) play an important role in human history. Accordingly, human values play an important role.

Today, nationalism seems to be the faith which fires our souls; but perhaps a new faith, human betterment, has a future. Persons are odd mixtures of good and bad, yet we seem to have a rage for situating everyone on a single simple linear scale. Yet there is no simple way of acquiring knowledge, and linear thinking fails to see uniquenesses.

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Presumably a lie is more likely to be falsified than is a truth. And self-justifying images are self-justifying only in the short-run. Yet the short-run can be a long time. Accordingly, we need new social inventions to protect us against the dangers of lies, self-justifying images, and mechanical views of history (perhaps claiming high predictive power). We must learn to search for knowledge and truth as a conscious, even socially conscious, effort--and become skilled in the task of human betterment.

> I do not believe that I have ever asked of the image of a social system that it would enable us to foretell the future. It is not too much to ask of such an image, however, that it give us a guide to present action and certain reasonably secure conditional expectations. . . . The most important property of man's image, however, is his ability to change it. . . . It is the will to learn which is its greatest question mark. . . . For the teacher is not an imprinter; he is one who cooperates with the inward teacher, the will to learn.[104]

We can think of theories about systems as being either static or dynamic.[105] A static-based theory compares one state of a system with another. A dynamic-based theory studies how one state of the system evolves or transforms into another state. (An equilibrium may be viewed as a state which reproduces itself, a special kind of dynamic system.)

Either theory, static or dynamic, requires an abstract (i.e., simplified) description of the state of the system. The theory tells us which elements are

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important, which elements to abstract. A very basic description of a two-element system would be a simple graph, plotting the welfare of one element vertically and plotting the welfare of the other element horizontally. We can, for example, think of the two elements as parties in a potential conflict situation. Any point on the graph would represent, say, the objective welfare of both parties together. Each of the two parties has, say, four possible moves: 1) Make party A better off and party B worse off; 2) Make part A worse off and party B better off; 3) Make both parties better off; and, 4) Make both parties worse off.

Each party has an image of what is possible; this opportunity or boundary may be mapped by shading an area of the graph. How one rates each point on the opportunity field depends on one's values. Some possible values include: 1) Party A is indifferent to party B's welfare and seeks to increase the welfare of party A; 2) Party A is indifferent to party A's welfare and seeks to increase the welfare of party B; 3) Party A is indifferent to party B's welfare and seeks to decrease the welfare of party A; 4) Party A is indifferent to party A's welfare and seeks to decrease the welfare of party B.

To make the model dynamic, we will assume a succession of moves. Each party moves based on the

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perceived opportunities so as to maximize what it values. (Note that what is or is not judged to be a conflict move depends on what the party values.) For example, over time--after a succession of moves--each party's perceived opportunities may become smaller and smaller, resulting in a state of equilibrium. Depending on the state of equilibrium, each party may be worse off than when they began.

Boulding points out that this model fails to take into account the human learning or macrolearning process. The very graph or theory or image will vary from one party to another; the image is learned and subject to modification. One's perception of opportunities is learned, and one's values too are learned and changing. Moreover, in the real world, one party does not necessarily wait until the other party moves before moving again. And the international system is composed of over 100 nation-states, not two. Despite all the possible and actual complications already suggested, which the model fails to take into account, some generalizations or tendencies nevertheless seem worth noting. Often our views tend to be self-justifying or self-confirming. We view X as good or evil and X's behavior then seems to confirm the view. "One of the rules of learning in conflict situations seems to be that

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each party learns to become like his perception of the other."[106]

Seeing the long view of things is learned; this is largely a matter of changing one's images of opportunities. Taking advantage of short run opportunities without regard to the long view may make one worse off, not better off, in the long run. In conflict management and in the international system we all must learn and macrolearn the long view. The area of opportunity differs, depending on short- or long-sightedness. Should both, rather than one, parties to a conflict become long-sighted--then a new threshold on the way to conflict management will have been reached. Nevertheless, despite the feedback or disappointments over time, some persons/nations fail to learn/macrolearn long-sightedness. Social inventions--if sufficiently researched, developed, and practiced--can presumably provide us with new thresholds to human learning and betterment.

A system (say, a person or nation) which has learned to be long-sighted is thereby more likely to learn realistic images. This seems to be the case, just as it also seems to be the case that reality <u>cannot</u> be found out. Yet lack of realism of an image (based in the value dimension of said image) <u>can</u> be found out.

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Certain insights into systems dynamics, already suggested, seem especially helpful in learning to realistically learn. The prisoner's dilemma, long-sightedness, thresholds, the self-fulfilling prophecy, and other eiconics-related notions presumably tend to lead us toward truth or at least away from error. Overly stressful or conflictual situations tend to lead us into mislearning and pathological behavior. A knock on the nose does not necessarily teach me how to optimize my long-term learning.

In the case of children, parents may serve in the capacity of outside party or learning matrix: "children do not learn the processes of conflict management from each other or from their peers, simply because the emotional trauma which results in the conflict processes is so great that it inhibits the development of long-sightedness."[107] The same principle tends to apply in the case of nation-states. Religion, formal education, the justice system, and laws may be viewed as learning matrixes, good or ill. Such social matrixes tend to promote learning or mislearning. For example, formal education tends to promote domestic peace and international war. Fortunately, it is possible for formal education and other social matrixes to macrolearn the importance of nuclear missiles and world war, and of finding more realistic means to human betterment.

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The learning of persons and the macrolearning of nations is future oriented and rooted in the past.[108] We may seek meaning or pattern in the past for the purpose of making better decisions about the future. As we look at the past we see stabilities and movements.

A dynamic system may be said to exist if there is a pattern in the dynamic process (i.e., a succession of states). (We have previously suggested that one kind or set of patterns is that of difference, i.e., differential, equations.) By looking at the past we search for patterns; we may then project this order into the future. In general, the information we have about the distant past is more noisy or unreliable than that of the recent past. As one looks for patterns in the informations, four epistemological possibilities present themselves: 1) A pattern exists and we see the pattern; 2) A pattern exists and we fail to see the pattern; 3) A pattern does not exist and we do not see a pattern; and, 4) A pattern does not exist and we see a pattern (superstition). While the past and the future are not epistemologically symmetrical, it nevertheless generally seems fair to say that the further we project into the past or into the future, the less reliable our perceived patterns become. If our knowledge of patterns influences the course of history, and if there are many patterns known to the future but not known to the present, then

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prediction of the far future is bound to be less than entirely reliable.

Detection of patterns in the past depends on receiving feedback or messages about the past and on developing images or models about the past. Messages about the past are received from durable or stable objects, as distinguished from objects which no longer exist. If an object exists in the present and if we know how such an object changes over time, then we can project the object into the past--thereby obtaining information about the past. Yet our knowledge of how an object changes over time--especially over a very long period of time--may not be entirely reliable. Our knowledge of the past is biased against non-durable objects and against patterns or models or laws not yet invented/discovered. Without the abstract model, the information will produce noise instead of knowledge. Abstraction allows us to loose information so as to gain knowledge. Piling on more and more information bit by bit is a kind of pseudo-sophistication. Abstraction also allows us to see where the gaps in our knowledge lie, thereby directing us back to empirical, but focused, studies or at least to educated guesses as to the general nature of the gaps.

Weak models or poor abstractions may include information which should be deleted and delete information which should be included. Hence the

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importance of having many models rather than one, of having an eclectic mentality. Quantificational or mathematical models have a special advantage in that numbers can be easily manipulated and combined; moreover, the predictions to be confirmed or falsified are rather exact. Unfortunately we sometimes emphasize the easy to the exclusion of the important.

In forming an abstract model of human history, we need a terminology and a method of sampling. To begin with, we specifically do not need the entire dictionary and we specifically do not need all data or information which exists. We first want to learn how to consciously describe a state of the system, then go on to describing the process of change from one state to another. In terms of the spatial aspects of history, developing a world map or globe seems like a good place to start in describing a given state of world history.

If we wish to study human history, we should take notice of humans. We would look at the human population and subsets thereof. Thus the historical importance of census records. We might wish to start with a complete census of all humans of all times, to the extent such is feasible. Because of the feasibility or scarcity or economic issue involved in the knowledge enterprise, we will next be forced to go to sampling of various populations, with the smallest samples being the most

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detailed. We have of course omitted the important issues of privacy rights and knowledge access.

Such a system of information collection and interpretation would next consider the process of change from one state of the social system to another. We notice, for example, that all systems have a consumptive or entropic aspect, and that some systems have a productive or anti-entropic process. One may think of a state of the system as having certain temporary parameters within which the various consumptions and productions operate. The dynamics (succession of states) of the system relies on production outpacing consumption; population, goods, or knowledge may increase or decrease. The rates of change in population, goods, knowledge, or the very parameters of the system itself may themselves change. Systems breaks and apparently random shifts occur. Unlike mere projection, prediction attempts to take into account such step-changes.

Accordingly, the notion of thresholds appears to be useful. We can, for example, think of an aging organism passing a threshold which leads to death. Instead of equilibrium, disintegration. Or alternatively, passing a threshold may lead to evolution: the egg becomes a chicken. Social disintegrations and evolutions may be less predictable than these biological examples. Nevertheless, it makes sense to try to evaluate society

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as to its health or lack thereof. For example, presumably we seek an evolving, rather than an extinct, human world. Doctors indeed may place a patient on the "critical" list.

Traumatic experiences can cause lack of learning and pathological learning (mislearning). This suggests the importance of parents learning proper child-rearing practices and of nations macrolearning proper management of conflict. Boulding suggests study, at the whole-society level, of "symbolic epidemics" or the processes by which new religions and philosophies take hold. The basis of community lies in the symbolic process--symbols, myths, ideologies, ideas, and so on. A faith involving core identity is much less likely to be bargained away than is a mere preference or interest.

Social science should develop a system of information collection and interpretation aimed at understanding how it is that nations or total societies macrolearn.

> Up to this point in the development of the social sciences, learning has been treated largely on an individual basis. The time now seems to be ripe for the development both of theoretical systems and of empirical studies of learning on the scale of the large society, or what might be called the "macrolearning" process.[109]

At present such data as this exists, if at all, mostly as a by-product from other interests. Moreover, such data is politically sensitive. On the other hand,

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given sufficient, and sufficiently reliable, data, reasonable methodologies already exist for proper interpretation of information. One can envision a global network of social weather stations for data collection. Such a social information system, simply by its very existence, furthermore, would influence nations to macrolearn. Thinking now in terms of feasibility of establishing the network, the task seems to be both necessary and difficult: "It is the basic illegitimacy of the nation-state itself outside its own borders that is the real problem; a world system of social data collection and processing must be legitimated by world organizations."[110]

Social communication (feedback) is obviously crucial to learning and macrolearning.[111] So shall we learn truths or falsehoods? After studying the philosophy of Hume, we may conclude that we cannot both know the truth and know that we know the truth. Yet in practice we seem to have little choice but to proceed as if our image of the world were more or less true. Hence the importance of faith in the possibility of image improvement, or learning. On the hypothesis that human persons exist and are not wholely different from each other, it seems that humans do to some extent inhabit the same universe and are able somewhat to communicate with each other. Good faith communication with each other

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presumably tends toward image modification in the general direction of truth. This hypothesized eiconic model of human persons and human communication implies that it is easier for the human species to agree on specific notions of what is false than on what constitutes the one true worldview. There are methodologies which the human species has found useful in detecting specific untruths even in the midst of disagreement over absolute Truth.

The partial images which constitute folk knowledge and scientific knowledge (as distinguished from literary knowledge) apparently rather reliably reveal untruths to simple folks and sophisticated scientists. An image, in terms of its own image or value system, may be found to be defective. Yet an unfalsified image may be found defective at some point in the future, near or distant. It seems that the past has shown some things false which had been believed true; likewise, perhaps the future will show some things false which we now believe true.

A nation, a system of nations, a horse, or a human who habitually mislearns or who is incapable of learning (i.e., the image usually goes from bad to worse, or the image never changes) is not mentally healthy. On the other hand, scientific methodology suggests one mode of learning. Science involves being clear and public about 1) a person's or an instrument's perception; 2) logical inference; and, 3) the details of the model invented/

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discovered in one's imagination. Sometimes a model works in one kind of universe or subset thereof, but gets into trouble by generalizing beyond its frontiers.

The methodologies of folk knowledge and of scientific knowledge are generally not very effective in the world of literary knowledge. Yet sometimes scientific methodology can be usefully applied to aspects of literary images. The international system is dominated by literary images; with the development of social science and of social science education, this can change.

The pathology of the international system (i.e., the nation-state system) is not only socially and mentally costly, but it is very expensive also in sheer economic terms. "This would include the total spent by all the nations on their military establishments, information systems, foreign offices, diplomatic corps, and so on."[112] And due to the advancement of science and technology, empire is now a bad economic investment. The nation-state system offers no economic advantage; presumably some sort of alternative model will provide economic and evolutionary advantages for the human species.

One can think in terms of the economic cost inflicted on one's society by one's own war machine. Typically, even in wartime, this is as much or more than

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the economic cost of the destruction inflicted on one's society by the enemy's war machine. Beware of one's friends! An insurance policy covering destruction of one's society by an enemy would cost less than maintaining a military establishment of one's own.

In terms of folk, literary, and scientific knowledge, what are the pathologies of the nation-state system? First, the simple frontiers of folk knowledge are inadequate: The social-political universe is both complex and pluralistic. Secondly, literary knowledge tends to be unrealistic:

> On the whole . . . the images of the international system in the minds of its decision-makers are derived by a process that I have described as "literary"--a melange of narrative history, memories of past events, stories and conversations, etc., plus an enormous amount of usually ill-digested and carelessly collected current information. When we add to this the fact that the system produces strong hates, loves, loyalties, disloyalties, and so on, it would be surprising if any images were formed that even remotely resembled the most loosely defined realities of the case.[113]

And, thirdly, the nation-state system pathologically violates the principles of scientific knowledge. Science is public, the nation-state is secretive. Science attempts to tell the truth, nation-states attempt to tell lies. National interest can courageously justify almost any evil; the evil of science is more limited, such as lack of moral courage. The spirit of science is non-hierarchical, open to good faith dialogue, and critical of its own images. The nation-

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state is self-justifying, self-seeking, and defensive. Science seeks truth, not political power; nation-states seek political power, not truth. An information network dependent on diplomats and spies in a system of nation-states is pathologically unreliable. Ironically:

> It is the moral, patriotic, and self-sacrificing individuals who are most likely to be the active participants in the international system. It is the organization, not the individuals, which is pathological, by reason of the corruption of both the information and the values that have produced it.[114]

Can the international system be transformed into a less pathological one? May we macrolearn ourselves out of the so-called prisoner's dilemma (previously discussed)? Is an improved global social system--a world of stable peace--possible or feasible, short of a pathological kind of world government? The invention of new social technologies which act as outside parties, changing the payoffs to the players, is one way to macrolearn. A bad decision-maker should receive bad payoffs; a good decision-maker should receive good payoffs. Persons and nations also need to learn to develop far-sightedness and a sense of world community, as distinguished from the short-run and the narrow perspective. Both of these approaches, rather than one or the other, are needed for nation-states to learn that they are not sacred institutions or great societies, but are social inventions subject to change so as to better serve the human condition.

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Advancement--the right kind of advancement--of the social sciences has much to contribute to the development of an improved international information and conflict management system. This includes the learning of more realistic images of the pathology of the nation-state system. On the other hand (whether in the development of social science or in the practice of war-gaming), we must guard against the temptation to believe that we have arrived at the truth. Certainty or dogmatism is more disastrous than dialogue. We must not overestimate the importance of what is consciously known and measured. The nonconsciously known and the unmeasurable may be more important. Good decision-making requires good use of both the conscious and nonconscious dimensions of the mind. There are grounds for cautious optimism and realistic radicalism. The macrolearning of nation-states, like the learning of human persons, tends to be cumulative: Perhaps

> the vision of a world in stable peace, which has haunted mankind so elusively for so long, will finally be realized. When it is realized it will be the result of a long process of learning, in which cheap methods of learning such as science and perhaps even accumulated folk [folk-literary] wisdom are substituted for the expensive methods of learning such as war.[115]

The Financing of Education

One key to economic development, according to Adam Smith, is the improvement of machines.[116] (Boulding

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sometimes refers to machines as "frozen images.") According to Smith, one major source of machine improvements comes from "'those who are called philosophers or men of speculation, whose trade it is not to do anything, but to observe everything; and who upon that account are often capable of combining together the powers of the most distant and dissimilar objects'."[117] The knowledge industry is crucial to economic development; at the same time, knowledge increase has economic costs or burdens of its own. The invention of social-educational "machines" or the improvement of social-educational "technologies" may make knowledge increase more feasible.

Knowledge increase suggests that each generation has a greater and greater educational burden to pass on to the following generations. Given certain burdensome parameters and a lack of social invention, a society's knowledge industry may be forced to retrench. Invention, however, can push back such parameters to allow a higher level of equilibrium for the knowledge industry. We can identify such changes in the parameters or niche of the knowledge industry with the development of speech, agriculture, cities, writing, schooling, metallurgy, manufacturing, printing, and science-based technology, for examples.

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All knowledge is not alike. Two knowledges or structures may be equally complex, both highly evolved (i.e., improbable), but from the viewpoint of human values (e.g., human survival, understanding, and betterment), one knowledge structure contains more meaningful knowledge than the other. Additionally, one should also remember that one product of the knowledge industry is negative or false knowledge. For example, in the twentieth century, formal education typically taught images of the world which tended to promote national peace and international war.

If we seek to develop a realistic model of the knowledge industry, we would do well to keep in mind that a ("wit" or bit of) knowledge, positive (true) or negative (false), is more or less relevant to this specific purpose or to that specific purpose. This suggests the importance of philosophic reflection on the purpose of education. For example:

> If we could get even a very rough measure of the stock, production, and consumption of relevant knowledge in this way, and relate these measures to the rate of economic development in different societies, I believe we would finally have the clue to the puzzling problem of different rates of development. . . . even though we do not put an absolute value on economically relvevant [sic] knowledge, we are surely justified in putting a high value on it, simply because it is this aspect of the knowledge industry which increases our power to satisfy all the demands on knowledge in the future.[118]

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One may abstract two aspects of knowledge increase: 1) the dissemination of knowledge; and, 2) the production of new knowledge. Either one may cause a "bottleneck" or limit for the other. Knowledge increase in a society requires development of both.

Yet there are vested interests within a society and within a society's knowledge industry which hamper (proper) knowledge dissemination and knowledge production. Humans are reluctant to hold up the "mirrors" or methods of science to learn more about themselves. Science and science-based technology has resulted in economic development, even if there is much about economic evolution which we do not yet understand.

> One of the greatest needs of our time is the extension of the principles of reality-testing, which have been so fruitful in science, to our images of social, economic, and political systems. It is our inability, and indeed unwillingness, to test the reality of our images of the world in this area that constitutes the greatest threat to the continued development of mankind.[119]

Knowledge or an image, unlike absolute Truth, may be positive (true) or negative (false).[120] Ignorance is either a false image, or the lack of an image when a true image is possible. Images exist; some images cause us trouble; sometimes troubling images cause us to revise the image. Although we have no proof, we nevertheless tend to think that a revised nontroubling image is closer to truth than the previous troubling image. Science is a

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particularly conscious and sophisticated way to revise certain kinds of images.

The economic system can be thought of as a subset of the social system. "As I am a great believer in making boundaries of all kinds insignificant enough to be taken off the human agenda, in both the international system and in the republic of letters, I am not going to bother very much about where the boundary lies."[121] However, knowledge, since it is bought and sold, can be thought of in economic terms as a commodity. A major problem then appears: Knowledge is intrinsically heterogeneous. A "bit" of information measures improbability; a "wit" of knowledge, however, would presumably measure the quality of the improbability. Communication at a peace conference seems more important than the gossip at a bar even if the bits of information are equal.

Another difficulty with an economic image of knowledge is that if it is "property," it is a strange kind of property. This piece of land belongs to me, not to you. This piece of knowledge ("2+3=5") belongs to both of us, yet each of us separately "owns" the full piece in its entirety. Unlike land-property, knowledge-property reproduces and is not exclusive, despite our social inventions called copyright and patent.

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Boulding identifies three areas of the economics or limits of knowledge: 1) exchange of property: theory of the market; 2) evolution: theory of development; and, 3) decisions: theory of decision-making. We have already briefly discussed the notion of knowledge as property. We now briefly discuss the notion of knowledge development. An equilibrium model fails to explain the evolution of knowledge. The production and reproduction of knowledge, or something like it (variation and selection), are the two processes of evolution. A population may not age if reproduction is sufficient to replace individuals who age and die. This maintenance function in the field of knowledge belongs, in part, to formal schooling. (And production or variation here may be called research.)

Boulding's theory of decision-making is based on the notion of alternative images of the future. From past payoffs we have learned images of alternative futures. We have likewise learned to more or less value this alternative or that. Preferences don't merely exist, they are learned and are subject to change. Sometimes we decide or learn that we do not want what we cannot get; Boulding calls this the Sour Grapes Principle. Sometimes we decide or learn that we want something because it is hard to get; Boulding calls this the Mount Everest Principle. A minor change in our image

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may transform our behavior from one principle to the other.

There is some tendency for humans to dangerously overlearn based on childhood traumas. Readiness to imprint or learn a specific knowledge is based on one's image, which is rooted in the past. One's role in an organization encourages certain messages and discourages others. Especially in an authoritarian organization, the decision-maker lives in an illusory world. Decisions are the only way knowledge has of influencing societal evolution.

A knowledge may be relevant for one purpose but not for another. For example, "few tennis players are much assisted by knowledge of the mathematics of moving balls."[122] And few economists are wealthy. On the other hand, as of approximately the mid-twentieth century, advice of economists to the United States government became worth listening to.

In decision-making we should remember that an input of garbage into a computer or a human image will result in an output of garbage. Mathematics should assist, not replace, hard thinking, on the part of the decision-maker. A computer or an expert may provide us with complicated or sophisticated images of how things work; yet we should always be on the search for simplifications. And we must be on guard against

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unwarranted certainties; in just this way, war-games may be highly dangerous to learning.

Rationality can lead to disaster. The best decision based on what we can consciously rationalize is only best in terms of that single subsystem. The whole and actual system may radically differ from the subsystem, real or illusory. Academicians and experts too often "devote their lives to finding the best way of doing something that should not be done at all."[123] Indeed, "being rational about subsystems may be worse than being not very rational about the system as a whole."[124]

Unfortunately, economists don't know very much about the social process called "development"--development of poor societies into rich ones. Yet, without economic development, education and learning stagnates or deteriorates. The United States has a choice to make between arrogance and humility. Instead of illusions of world greatness, we need to learn the realities of world problem-solving. In the 1930s, economists devoted themselves to the problem of unemployment; today the problem is survival of our species. We cannot afford to ignore the related problems of economic misdevelopment and human mislearning.

One may engage in exchange economics (a double transfer) by exchanging a $100 bill for a TV set.[125]

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One may engage in grants economics (a single transfer) by paying taxes to a government. In the United States, the largest segment of the grants economy is devoted to national defense; probably the second largest segment of the grants economy is devoted to formal education. Most, but not all, formal education in the United States is financed by taxes.

Taxes have both voluntary and involuntary aspects about them. When we think of the I.R.S., we may think of coercion. Yet organized taxpayer revolts, too, are legitimate. These considerations suggest that there are parameters which limit taxation; Americans may now be near these boundaries. Taxes may have already filled their American niche. In such case, new social and educational inventions may have important niches to fill.

There is reason to believe that more education generally means that an individual will both earn a higher income and make better decisions. In a manner of speaking, these are very tangible benefits. Yet many of education's benefits are intangible, perhaps even dangerous to seriously quantify. Certainly one can think of alternative views over whether a given decision was better or worse. Sometimes, too, a relatively uneducated person may be wealthy, and a relatively educated person, poor.

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If a grants economy is better in the case of intangible benefits, and an exchange economy is better in the case of tangible benefits, then perhaps a mixed economy is best in the case of education. One may then inquire as to the optimum grants-exchange mix for formal education.

Unless something is done, the next 25 years (say, approximately 1968 to 1993) or longer will be a period of educational retrenchment. The reason for this, in the absence of new social-educational inventions which society selects to implement, is two-fold. On the one hand, we must increase knowledge if there is to be an increase in productivity. On the other hand, it is difficult to make education more and more efficient without it being turned into pedantic training and therefore counter-productive. In the absence of social invention, an increase in knowledge means an increase in the size and expense of education. Yet there are limits to taxation and there are other social needs beyond education. Without a realistic appraisal of the situation, whether in the 1960s or the 1990s, economic and educational reforms will be largely ineffective. Invention, not efficiency, is the solution if there is to be one.

On the one hand, economic productivity seems necessary; therefore knowledge increase is necessary. On

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the other hand, it seems necessary to limit the burden of taxation and the portion of it devoted to education. This cycle gives the appearance of being both necessary and self-defeating.

What economic or educational invention does Boulding advocate? The logic of the above suggests that once education has filled its niche in the grants economy (taxation), then it must look to expanding its niche in the exchange economy. Like world peace, this may be easier to achieve than one would first imagine. To be successful, such new inventions must meet, say, two standards. One is that the invention must be realistic or feasible; many educational, international, and economic inventions were destined to fail from the start simply because the images on which they were based were illusory. But, given that an invention meets, apparently, the criterion of realism or feasibility, it must also be selected for by society; one can think in terms of a threshold of support by sufficiently numerous and powerful decision-makers.

Studies clearly show that, in general, the more years of formal education attained, the higher one's income later in life. Conventional means of financing risks in the exchange economy seem less than adequate to meet this educational need. We want the educational needs of many, rather than only a few, to be met; the

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financing would be long term, not short term; and, moreover, some better educated persons are not economically well off.

> There is a case here, then, for the development of what might be called a public exchange economy. All government operations do not consist of grants. Many of them, indeed, such as social security have only a relatively small grant element and consist essentially of what might be called a public deferred exchange system. Education would seem eminently suitable for such an arrangement and proposals such as that of Professor [Charles C.] Killingsworth . . . the setting up of a public educational bank which would be prepared to extend loans to any qualified student in sufficient amount to enable him to continue his education for as long as it seems profitable for him to do so. These loans would then represent not a chattel mortgage, which is quite inappropriate to the human person, but a general claim on future income which could easily be satisfied by a 1- or 2-percent addition to the person's income tax.[126]

Whether such a scheme would actually work would depend on giving sufficient attention to working out all the difficult details, Boulding says. But, given such a scheme, there would no doubt be both positive and negative payoffs for the universities. For example, is the customer (the student) always right?

Presumably we want our system of formal education to produce knowledge.[127] Indeed, the goal is true or positive knowledge, not false or negative knowledge. Indeed, indeed: Valuable or important positive knowledge seems preferable to unimportant positive knowledge. Do elite educational institutions produce much more knowledge of the true and valuable variety than do the

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less elite or average institutions? In one sense, Boulding thinks not. But in another sense, one must consider that it is the elite who attend the elite schools. Most who attend the elite schools learn thereby that they are elite persons. Many who do not attend elite schools learn in school that they are nobodies; the formal educational experience is at times painful, at other times apparently grossly irrelevant. If we learn as a child that we are stupid, we will probably believe the rest of our life that we are stupid.

The education industry, like the housing industry, is unprogressive and subject to arbitrary fashions. However, education is usually bought for you by someone else--by your parents, church, or nation-state. The feedback mechanism, accordingly, is weak and unreliable.

It is not necessarily altogether wrong-headed for a teacher to develop explicitly stated "behavioral objectives." On the other hand, as a ritual it can be dangerous. This ritual is yet another example of the self-fulfilling prophecy; you the teacher state only what you can confidently predict will occur. What is difficult to measure or not measurable for years hence is unimportant. Image or worldview modification in the student and in the teacher are deemed secondary rather than primary.

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The total grants economy tends to be relatively stable; how the grants are divided up (defense, education, etc.) is relatively unstable. Accordingly, what is happening in other parts of the grants economy influences relatively strongly the effective demand for education.

As the television industry became more productive, the relative price of a TV decreased. The education industry, and other "craft" industries, on the other hand, are unprogressive, meaning that the price of education, relative to the price of a TV, increased. "Teachers' salaries have to rise at least roughly in proportion to the general rise in incomes and teachers' productivity does not rise in anything like the same proportion."[128]

Educational vouchers would perhaps allow more variety, competition, and experimentation in education. At both the national and world levels, Boulding seeks a mosaic or pluralistic society at peace. Presumably the educational future, like the educational present, will be very complex; nevertheless we may be able to identify some factors affecting the future demand for education.

In developed countries, there is a shift in process from a triangular age distribution to a rectangular pattern. This means that more and more persons live out their full maximum lifespans. Older-aged persons,

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accordingly, would exert great political and voting power in the early twenty-first century. Yet grandparents tend to be less supportive of education than parents. Educational disaster, therefore, is not impossible. The rectangular (non-hierarchical) pattern also apparently means less chance for promotion. Presumably the educational system would be modified by the rectangle and its implications.

In 1970 Boulding predicted an increased demand for kindergarten, even pre-kindergarten. Formal education has unfortunately contributed to the poverty condition of the poorest 20 percent of our population. National, rather than local, grants to help in the proper education of very young children may be part of the solution.

Segregation of our children and our teenagers in school means that peers--as distinguished from adults or society generally--have great influence on behavior. This experiment or situation is unique in human history. Such youth-peer cultures may cause much mislearning. A pyramidal society of short-lived persons which is substantially on its way to becoming a rectangular society of long-lived persons would be well advised not to idealize youth and youthful mislearning. Indeed, it is not inconceivable that "the whole educational system will be revised radically in the interests of developing satisfactory personal identities, satisfactory whole life

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patterns of behavior, and an integration of youth with the society in which they are embedded."[129]

Since future educational demands, burdens, and financing are unpredictable (despite the tentative conditional predictions above), we would do well to be extremely flexible in our educational planning. The new social-educational invention advocated by Professor Charles C. Killingsworth (see his Testimony to the United States Senate on Employment of Manpower--September 20, 1963) has much to recommend it, despite the contrary interests represented by the Association of Land Grant Colleges. On the other hand, in the last quarter of the twentieth century it seems likely that taxpayer revolt will increase, for reasons previously discussed.

Accordingly, something like Killingsworth's 1963 proposal may be selected for in the course of societal evolution, perhaps late in the twentieth century. The Killingsworth invention avoids charges of charity, on the one hand, and of chattel mortgage on the other. "As long as the near-monopoly of the public school system exists intact, substantial technical changes are unlikely to be forthcoming."[130] But if the right kind of financial-structural educational inventions are selected for by American society, this outlook could change.

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The Allocation of Educational Finances

Capital counts in the economic evolution of a society, but in the long run knowledge is more important.[131] But knowledge, like capital, is a scarce resource. Scarce resources may be allocated more or less wisely. The maintenance function of knowledge (from generation to generation) obviously differs between a "pyramidal" society of short-lived persons and a "rectangular" society of long-lived persons. A society of long-lived persons is more likely to engage in research (new knowledge) rather than in maintenance education only.

Boulding suggests a process of social-educational self-examination: 1) Examine the society's formal and informal systems of education, including factory and family. 2) Determine how much of the educational process is devoted to replacement of existing knowledge (the maintenance function) and to production of new knowledge (the research function). 3) Which intellectual resources are being underutilized? In answering this question, consider: A) What blocks to learning exist and how may they be overcome? B) Which knowledges are useful and which useless? C) Where does redundancy in our knowledge exist? D) Although specialization of knowledge serves a very important, even necessary, function: What communication or interdisciplinary networks are lacking

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which would serve valuable educational (knowledge increase) functions? 4) Is research researching the right things?

Science, and education (knowledge increase) generally, are not disinterested activities: They move toward perceived payoffs. Big government and big business provide research funding. Are they "directing intellectual resources towards the solution of unreal, unimportant, or insoluble problems"?[132] Educational resources are indeed being misallocated: 1) Existing useful knowledge which should be widely disseminated is not being so increased. For example, experts know that in the present international system, nation-states are dangerously ethnocentric. 2) Existing research is dangerously one-sided in favor of the physical and biological sciences, whereas the big problems facing our species are social in nature, requiring social science research.

Boulding gives six examples of our great and dangerous misallocation of intellectual resources: 1) Transportation has a vested interest in cement; floods are treated as river-problems rather than person-problems. The billions of dollars we have spent on flood control has on the whole made us more, not less, vernable to floods. Instead of corps of engineers, we need architectural designers and intelligent zoning laws. 2)

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Our increase in biological or health knowledge has resulted in a dangerous population explosion in the poor countries. 3) We have a similar situation, a compounding of the population problem, in the case of our increase in agricultural knowledge. 4) Inadequate, premature social knowledge (unrealistic religious or political ideologies such as Islam or Marxism) will lead a society to disaster. 5) Instead of security, the advancement of physical science which resulted in nuclear missiles, has produced national and international insecurity. This insecurity costs humans billions of dollars. We should be spending billions on the research and development of international systems of conflict management. 6) Folk-literary knowledge is dangerous, especially in today's world, apart from scientific knowledge. We have long accepted this premise with reference to inorganic and biological systems. The need for dissemination and production of scientific knowledge regarding social systems, including the social processes of learning and macrolearning, is very great.

It is difficult to be wise prior to a disastrous event.[133] But it is also difficult to be wise after the event. Without adequate, realistic analysis, we may mislearn or overlearn from the traumatic experience. With one eye on the past and the other on the future, we

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must coordinate our sight so as to realistically allocate our educational resources.

Based in the discipline of economics, we may now proceed to formulate a theory of proper allocation of intellectual resources:

> if we are dividing a given quantity of resources among a number of different uses, an amount should be allocated to each use such that the marginal return per unit of resource is the same in all uses. . . . As a purely formal theory, this is fine, but it does not help us if we cannot measure the marginal returns.[134]

The "taxation" or public grants economy, which presently includes most formal education in the United States, provides relatively little realistic feedback. Moreover, it is not altogether clear what standards should be used to judge an educational system or the "knowledge increase" function in a society. The educational decision-makers pretty much impose their decisions on the students. In the absence of satisfactory and sufficiently detailed standards which a pluralistic, changing, democratic, learning society would feel comfortable with, we are unable to reliably calculate rates of return on the educational investment. This forces us, then, to look at the very process or structure of our educational system in search of obvious biases in the allocation of intellectual resources.

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The image of a structure with old, uncreative, powerful decision-makers, and young, creative, nonpowerful researchers, comes to mind. The answer is

> to organize the system so that there are checks and balances and that a young man with an idea who gets a rebuff at one place can find a sympathetic ear at another. It is curious how something like the simulation of the market is almost always the answer to the problem of undesirable concentrations of power.[135]

Varieties of schools of thought in each intellectual subculture would provide such checks and balances to the old, the powerful, or the intellectually fashionable. This does not, of course, solve the entire problem, especially the problem in the larger society of fashionable or accidental political changes. Moreover, some good causes lack political power, and some bad causes are politically powerful. An image comes to mind: the brain drain into unproductive war industries at the national and world levels.

Let us look, for example, at America's allocation of educational resources specifically in the discipline of economics (Boulding's home turf). By looking at the percent of GNP of a topic, and comparing this with the topic's study (or lack thereof) in economics journals, Boulding draws some conclusions. Agriculture appears to be overstudied and fishing understudied by economists. Economists have neglected housing, health-medicine, war-defense, conservation-environment, and education.

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Agricultural economics was developed by schools of agriculture. Educational economics was scarcely developed by schools of education. Unfortunately, the structure of the discipline of economics as just described seems to have been remarkably "stable" over a number of decades, despite changes in economic methodology.

The intellectual subcultures seem to be remarkably out of touch with the real world of human problems. Apparently the misallocation of educational resources is great. Unfortunately, there does not seem to be much interest in studies of this kind--"The Allocation/ Misallocation of Intellectual Resources in Discipline X"--either from grantors or grantees.

> Scientists, even social scientists, are somewhat averse to self-study, just as the universities are, perhaps because the results might be embarrassing, and these studies, at any rate up to now, have not become fashionable among the dispersers of research funds. An institute for the scientific study of science seems a long way off, yet perhaps there is hardly any other investment in which the granting agencies might indulge that would provide higher returns.[136]

The Teaching of World Community

Some things known by experts are so valuable that they should be disseminated to all, not just to some or a few, human beings.[137] In our era the principle knowledge-dissemination (as distinguished from knowledge-production) task in education "is to convey from one

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generation to the next a rich image of what I call the 'total earth.'"[138] The social sciences, the biological sciences, the physical sciences, the humanities, and the arts can all organize their curriculums around the notion of the "total earth."

Social scientists study the sociosphere: The level of study is humans and their organizations. On the other hand, biologists (those who study the biosphere) engage in a number of different levels of analysis--from, say, molecular biologists to population biologists. There is, then, a kind of unity present in the social sciences not true of the other sciences. Accordingly, economists should study anthropology, and anthropologists, economics, so as to achieve sooner rather than later, and realistically rather than prematurely, a unification of the social sciences. Yet we teach in disciplines or specializations; this confuses students and deters all from the needed synthesis. The sociosphere is a single unity worthy of study.

Thinking in terms of "general systems" fosters interdisciplinary communication and the perspective of the earth as a total system. The educational or learning process involves attempting to perceive systems or patterns in the four-dimensional matrix we call reality. There are at least four kinds of systems or dynamics: 1) a mechanical pattern or stable relationship, such as the

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solar system; 2) the "wallpaper principle" or life cycle pattern, such as egg-chicken-death; 3) evolution or learning: "These can be put together because they are essentially the same thing."[139] Both operate by the process of variation-selection. 4) The decision system: As we consider alternative futures, we can think in terms of a decision tree, a sequence of decisions oriented toward the future.

Saying that people decide to do what they decide to do does not take us much further than introductory decision theory. Thus let us consider: Structure directs the flow (and lack of flow) of information, for good and ill. For example, let us consider an equilibrium system. Society is not unlike a pond. Typically, each species (chemicals; vegetation; frogs; fish) is more or less stable in population. In the "pond" we call society, the species include corporations, ideas, laws, universities, armies, nations, supermarkets, churches, schools, automobiles, police, and criminals. If it is not possible to do just one thing, the structure or parameters of the pond determine the all-important details of in what way precisely it is that this thing is related to the other things. "The ideal time for formalizing this concept would seem to be in high school algebra when the student is studying simultaneous 2equations."[140] The pond, the forest, the city, and

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the world are constantly working out these equations in four-dimensional reality.

Homeostasis is higher on the evolutionary scale. In ecological equilibria, the equations just happen to more or less work out to establish a more or less stable pattern. A homeostatic system, however, is structured to actively obtain feedback for the valuable purpose of self-stability. After equlibrium and cybernetic systems comes ecological succession. The equilibrium or the homeostatic system is upset in some way: The system will then either disintegrate or find new parameters. A pond becomes a swamp which becomes a forest, and the ecological succession resulting in the forest may then stabilize. We can think of a human mind in terms of its ecological succession.

Do some human activities do more harm than good? Does medical science (consider the population explosion) do more harm than good? Does government or teaching or formal education do more harm than good? Are the "forced feedings" of grades and assignments harmful to quality learning?

> One of the things which is most puzzling is why some people survive the educational process and some do not--in the sense that after they have gone through formal education they never seem to learn anything again. The main object of formal education should be to teach people how to continue learning, yet as educators we fall very far short of this idea.[141]

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In addition to matters considered immediately above, what else should receive priority in the teaching of the social sciences? From anthropology the student can learn that there are a wide variety of stable cultures. If all humans tend to be highly ethnocentric, all humans should learn to be less so. Even the very young should feel that there are many alternative ways to do something. "I am convinced that if a thing is worth doing it is worth doing wrong, or at least worth doing in many ways."[142]

We should also teach that some systems have the capacity for regeneration following a disaster. Moreover, we should teach that conflict is not necessarily bad, although conflict, if poorly managed by one party, can be disastrous to all parties. Students should be taught better and worse ways to manage conflict at the personal, national, and international levels.

Boulding identifies one conflict which educators should explicitly make themselves aware of, and which they should attempt to learn how to manage, but not how to resolve. This is the conflict between the "superculture" of universities, airports, and science, and the regional cultures of localities and nation-states. The superculture is a worldwide culture and a partial culture: This explains why it is important that the controversy be managed and not be resolved.

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Academics and educators, unfortunately, tend either to ignore the controversy or to assume that the matter should be resolved in their favor. To the extent that the superculture is taught in elementary and secondary schools, it is paid for largely by local taxes.

Obviously formal education needs to teach facts--but how many facts and which ones? One can think in terms of rote learning versus quality learning. Moreover, in the face of the knowledge explosion, "it becomes almost criminal to teach people things they do not really need to know, if this prevents them from learning things they do need to know."[143] Boulding here has four tentative suggestions: 1) We need to learn orders of magnitude about the world, not memorize isolated, precise facts. 2) Instead of cramming one's head full of isolated names and numbers, we need to learn where to look things up and how to search for needed information. 3) We need to learn that persons and societies are part of a 4-D space-time continuum; we must teach history-geography as a single discipline from this new perspective (i.e., history as geography in 4-D) instead of pathologically from the perspective of the nation-state and of the West.

And, 4) One must learn to distrust one's personal experiences. That is to say, we need to teach students the necessity and nature of proper sampling. If teachers

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should start from where the student is, that does not mean we should end up there. Deweyism sometimes emphasizes the former point to the exclusion of the later. If where we are is interesting, even more interesting is where we might be in the future; "the purpose of education is to get you from where you are to where you aren't."[144] Pure empiricism unfortunately biases one toward what exists in the past when, just perhaps, the real fun is yet to come. Learning why something did not survive in the (past) course of evolution may be difficult, but it is important.

Generalizing from one's personal experience to the whole society or world or universe is a very dangerous political problem. One's personal experience, students should learn, is a very small and very distorted or incomplete sample of the whole of reality (past, present, future). We should teach students something about how to go about sampling the whole. Moreover, we do not want to teach students how to live in a past universe which no longer exists. "What formal education has to do is to produce people who are fit to be inhabitants" of this small spaceship, earth, our home.[145]

The international system is one component of the "total earth" curriculum which should be taught.[146] Students should learn that national or international leaders, like all decision-makers, do not make decisions

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based on objective facts but rather on their image (view or interpretation) of the situation. If decisions are based on the image, then students should be taught eiconics, the science of the image. In terms of a nation-state or a world of nation-states we can think of two groups of people, the elite decision-makers and the mass (the ordinary people).

The image of one's nation-state is primarily a mass image formed in childhood; this is true for both the ordinary mass and for the decision-making elite. Formal education confirms or reinforces the nation-state image. By contrast, imposed images are weak. The national image is largely a sacred story told about the past. Its scriptures may be verbal or written, such as the Declaration of Independence. Unfortunately, formal education has too often neglected the total earth in favor of a single nation-state and taught lies to glorify it. There are indeed virtues to be found in the national image, but the image is built on a willingness to lie. The notion of national interest may be used to justify almost anything, no matter how cruel or disastrous. The citizens experience their national history by sharing it with each other in story and ritual. War stories are especially dramatic and tend to be incorporated into the sacred story, thereby underestimating the place of peace throughout history.

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There are at least three dimensions of the international system which should be taught. First the teacher may point out that almost every piece of land on the globe belongs to one--and only one--nation-state or another. One at least imaginable alternative would be for nations to govern persons (wherever located) instead of territory. One reason the present international system is so conflictual is that one country can expand its territory only at another's expense. However, with the rise of science and science-based technology, including its economic benefits, empire proved to be economically burdensome.

The second dimension is the relatively friendly or hostile relationship between two nation-states. Beyond this, we may visualize the relationship, good or ill, as either temporary or stable. In the nation-state system, "most nations seem to feel that their enemies are more hostile toward them than they are toward their enemies. This is a typical paranoid reaction."[147] Relations of stable hostility tend to be "between adjacent nations each of which has played a large part in the formation of the other"; on the other hand, "stable friendly relations seem to exist mainly between strong nations and weaker nations which they have an interest in preserving."[148]

The third dimension is the relative strength or weakness of a specific country. This dimension is more

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complicated than it may appear at first sight. For example, in history, were the Jews strong or weak? "The Jews have outlasted an impressive succession of conquerors."[149]

There is a tendency for country A to be friendly to B if B is friendly to A--and of course the reverse tendency in the case of hostility. These tendencies are only two factors of many relevant factors in the complex international process. Boulding says that mechanical models of society or of the international system, including the mechanical models developed by Boulding himself, can provide important insights even though they are bound to dangerously oversimplify the complexity of reality. A decision-maker may use a mechanical model, then, not to determine the proper or optimum decision--but simply as one imperfect message amidst other important feedbacks as one engages in reflection prior to action. For example, mechanical models do not seem to be very helpful in telling us in advance when an image will reorganize itself. Hence the virtue of uncertainty and of flexibility on the part of decision-makers.

Nevertheless, one has the impression that we are not entirely ignorant of the larger or longer-term patterns of the nation-state system, just as we seem to know something about how various economic systems operate. Indeed, the field of international conflict

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management may advance with some parallels to the advancement of our economic knowledge. A pure nation-state system tends toward hostility or war; a pure market economy tends toward deflation. In each case, a "mixed" system seems preferable. Germany, Japan, and the United States are examples of "mixed" economies.

In economics, depressions are no longer viewed as "acts of God." It is the dynamics of the system as a whole which engender depressions; once we became conscious of this we started thinking in terms of controlling the economic system so as to bias it against depressions. Likewise, we now need to learn to see the international system as a whole, with an eye to controlling it so as to bias it against war.

Apparently the nation-state system and our lack of advancement in relevant social learning may result in extinction of the human species. Hence the very real need--as a student, as a teacher, as a grantor, as a researcher--to study more closely the pathologies of the nation-state system and consider a variety of alternatives, large and small:

> the unsophisticated image sees the world only from the viewpoint of the viewer; the sophisticated image sees the world from many imagined viewpoints, [and] as a system in which the viewer is only a part. . . . The patriotism of the sophisticated cannot be a simple faith. . . . The growth of a systems-attitude toward international relations will have profound consequences for the dynamics of the system itself, just as the growth of a systems-

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> attitude in economics has profound consequences for the dynamics of the economic system.[150]

Students should learn that both persons and nations behave as they do because of their perceptions of what the payoffs to that behavior may be.[151] Laws at the local or world level may change the payoffs. A "third" party (e.g., an organization or a law), especially when "both" parties consider it to be legitimate, may be able to provide payoffs promoting peacefulness and farsightedness.

Students must be taught about the "prisoner's dilemma" and the two successful ways of getting through its horns. A "third" or "outside" party to a conflict, such as a law,

> has a role as part of what might be called the legitimized threat system in changing the payoffs to illegitimate violence. This is illustrated in a famous situation in game theory known as the "prisoner's dilemma." If we identify two decisions of A and B as being "peaceful" or "warlike" then if both are peaceful, they will both be better off than if both are warlike. On the other hand, a condition in which both are peaceful is unstable because, if one is peaceful and the other warlike, the warlike one gains over the position in which both are peaceful. Then if one is peaceful and the other warlike, the peaceful one can gain by becoming warlike so that they are both warlike. The dilemma, therefore, is that the short-run dynamics of the system are continually forcing the parties into positions which everybody is worse off than he might be, if it did not pay one party shortsightedly to resort to violence. One of the purposes of the legal system, then, is to change the payoffs of the "game" in such a way that it will not pay either party to depart from a situation in which both are peaceful.[152]

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Compared with war, talk is cheap. Sometimes talk can even resolve or manage conflict. Laws, if they are to be generally successful, cannot rely on threat alone. Successful laws act as teachers, modifying one's image of community or society. Children and nation-states, lacking a strong sense of community, often resort to violence. Mature adults learn to look at the long-range payoffs. "In other words, in the solution of the prisoner's dilemma, the development of mutual long-sightedness is just as effective in giving stability to the situation in which both parties are peaceful as is the alteration of the payoffs through the institutions of law and punishments."[153]

Of course, law students may nevertheless be especially interested in the "third" party or "law as teacher" solution to the dilemma. But either approach is a learning process. We can, on the one hand, learn to change the system so as to restructure actual payoffs, short or long. On the other hand, we can learn to be more realistic as to what the long-term payoffs, whatever they are, will be. If a new law or legal system is a change in the general system, it may also teach one to become more realistic. There's no reason laws cannot mediate win-win solutions instead of inflicting punishment, which is a win-lose or even lose-lose "solution."

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> Punishment is a poor teacher because of the inner conflicts which it creates. It is for this reason, perhaps, that society has tended to separate the legal from the para-legal institutions and this may indeed be very desirable. On the other hand it is also desirable to look at the legal and the para-legal institutions as a systematic whole with the same ultimate end, that of promoting a learning process in society and toward political and social maturity.[154]

The danger of law or of third parties is that those in conflict may not learn how to realistically manage conflict situations on their own. Learning to be realistic, peaceful, and farsighted is often undramatic, slow, and unperceived. Over time, personal armament in "the Old West" evolved into personal disarmament--even though no such explicit decision was made. Yet, if unconsciously, a whole society or network of societies may in this way learn or evolve.

At the international level, the information or propaganda put out by a nation-state may be believed by its own people and disbelieved by everyone else. Such an information system is unscientific and does not lead to realistic images nor to good faith dialogue among the peoples of the world. Almost all of our international attempts at planning and rationality are related to threat or war or defense. All of us, especially educators, intellectuals, and, in particular, lawyers, should learn to be more conscious of our potential roles in the building up of an integrative world community of peaceful, farsighted learners.

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Formal education (i.e., teacher-assisted learning) should be evaluated in the context of the entire process of learning, formal and informal.[155] Of course much of our knowledge is learned nonconsciously from our subculture. A complex society may be richly filled with inconsistencies. Educators should attempt to be aware of the social universe of informal and nonconscious learnings.

How may teachers, especially teachers of social science, expand the worldviews of their students to encompass the total earth, even beyond? Teachers should learn to view themselves and their roles as part of the cosmic evolutionary process. Life-long learning, then, is what the teacher wants the student to learn. A vocabulary for, say, reading, writing, speaking, listening, and ciphering seems basic to life-long learning. It's easy enough to say: Communication is the key.

Perhaps statistics is important enough not to be reserved to the college elite. We have previously discussed the great educational importance of sampling; certainly all humans should be taught the pitfalls of personal experience. Students should also be taught concepts and conceptual contexts as part of their vocabulary. The notion of "total earth" is just such an integrative structure for life-long learning.

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Perhaps a teacher can think of the classroom as a social system and of teaching as a kind of research aimed at the advancement of knowledge. Indeed, teaching forces the teacher to learn, to learn well enough not to be made a fool by questioning students; teaching nonsense or something one does not understand is not easy.

Feedback or evaluation is highly important in the learning process. What constitutes optimum feedback between teacher and student is a good question. In life generally, evaluation and learning are not so separated as in formal schooling. Assuming the tests are returned to the student, it is often unclear to the failed student what has gone wrong. How to properly evaluate the evaluation process itself, is a double puzzle. But, in general, teachers should cheer up their students rather than destroy their dignity.

Unfortunately, most university departments in the social sciences will not permit a Ph.D. dissertation on the teaching of the social sciences. Also, schools of education tend to have low status compared with other departments. This is disastrous, since knowledge is so important for an evolving or learning society. Having good doctors or lawyers would seem to be less important than having good teachers. (Our improvement in public health and life expectancy has not been due to that segment of society who are practicing physicians.)

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Accordingly, research is needed to determine why teaching and the study of teaching has such low status; this would be a much needed first step in the advancement of teaching and the study of teaching.

Unfortunately, teachers are isolated in their classrooms: Researchers are unable to learn from them and teachers are unable to learn from each other. Perhaps team teaching would improve matters and be less intimidating than outside observers. Perhaps team teaching would encourage dialogue aimed at non-threatening teacher self-improvement.

Feedback from students may improve teaching. Yet the economic payoffs are for research and writing and outside speaking, not for teaching. Teaching aids may help. Unfortunately, no system exists to critically and systematically evaluate the aids, which can take on a life of their own. Indeed, it can be very dangerous "to concentrate on specific and particular performances and behavior . . . [instead of] the total development of the individual."[156]

If student feedback and educational aids may have an impact on social science teaching, the most important impact in the long run may be the advancement of the social sciences themselves. Yet there are advancements and there are advancements. What we now need is social science, not social sciences. We must learn to perceive

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and treat the entire sociosphere as a single system. For example, anthropologists should be encouraged to study economics, and economists, anthropology.

Any division of the social sciences is arbitrary; moreover, "the differences within the existing disciplines are probably greater than the differences between them."[157] Development of disciplinary subcultures tends to work in favor of fragmentation and against social science as a unity of meaning: "the fact that the major political power rests with the departments and the professions they represent means that attempts to teach a unified social science are regarded with suspicion or even with contempt."[158] Especially at the high school and undergraduate levels, this fragmentation hurts students in their quest for meaning. The undergraduate introductory courses would be much improved if taught by full professors instead of by teaching assistants.

When one looks at the unsatisfactory content of the elementary school, high school, and undergraduate college texts and curriculums, one is tempted to organize a teacher revolt. Copernican astronomy and Darwinian evolution struggled in their cultures, as social science struggles today. We are no longer required to teach that the earth is flat, but today we are required to teach that my nation-state is best. Social science teachers

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therefore are particularly open to attack, even more so than the other academicians. Social science necessarily deals with controversial social issues.

In their quest for political and personal solutions, students receive little assistance from teachers. Teachers should promote individual and social self-consciousness and responsibility even when this conflicts with self-interest, religion, or the nation-state. We must put a high value on the ethics of science, i.e., on evidence, veracity, openness, and curiosity, instead of authority. The nation-state system encourages secrecy rather than openness, and power rather than truth.

We should give up pretentions to value-free learning or indoctrination-free education. According to eiconic theory, knowledge or education without preferences or ethics is inconceivable. Teachers, then, should engage in ethical self-analysis. Consider, for example, the following nine teacher-evaluation self-queries:[159]

1. Ought I, the teacher, abuse my "position of superior status to the student by treating him as a moral or social inferior?"

2. Ought I, the teacher, "force factual acceptance of propositions which may be only opinion or hypothesis?"

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3. Ought I, the teacher, be hostile or encouraging toward my students?

4. Ought I, the teacher, be interested and enthusiastic in what I teach? Boulding suggests "rotating courses among teachers, so that nobody teaches the same course for too long."

5. Ought I, the teacher, "convey to my students both the setting and the significance of my subject matter, so that it appears neither isolated nor irrelevant?" "There is a certain division of opinion here between those who favor orderly presentation of subject matter and those who believe that the main function of the teacher is to digress, assuming that the textbook is usually orderly enough and that the function of the teacher is to introduce a little creative disorder by showing the student that no subject is as tidy as it seems."

6. Ought I, the teacher, "convey to the student the necessity for intellectual discipline and a sense of the need for hard work on difficult intellectual tasks if the practical problems of our society are to be solved?" "The teacher in the social sciences, especially, has to walk a difficult tightrope between the kind of despair and atrophy of the moral sense that sometimes comes from overintellecutalization and the hyperactivity that can

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easily be destructive of those who are both morally aroused and proudly ignorant."

7. Ought I, the teacher, "convey to the student the importance of technical skill and, at the same time, leave him problem-oriented rather than technique-oriented, the master and not the servant of the skills which he has acquired?"

> The danger of the technique-oriented education is that it creates what Veblen called "trained incapacity"--persons who are trained exclusively in techniques prefer to do only the things that can be done with the techniques that they have learned rather than to tackle jobs that may be more important but that are unresponsive to their existing tools, like a surgeon insisting on using his scalpel to dig away a snowdrift. The teacher often tends to underrate what he does not understand and overrate what he does understand, and it is hard for him to walk a tightrope between these two extremes.

8. Ought my relation to other teachers be one of jealousy and suspicion, or "one of cooperation in a great common task of transmitting and extending the knowledge structure of society"?

> Hypocrisy, subterfuge, and corruption are visible symptoms of ethical strain. The social sciences may perhaps make an important contribution to solving this problem by pointing out that the answer to ethical strain may not lie in stepping up the level of exhortation and preaching. It may lie, rather, in reorganizing the institutions and the payoffs of society itself. . . . the one great unstudied area is the university itself, perhaps because it is too close to home.

9. Ought I, the teacher, have a sense of self-worth and of the importance of the educational task of teaching and research?

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Toward a Restructuring of Education

If a social or educational system is to be forward-looking or futuristic, the question naturally arises as to what extent successful prediction of the future is possible or feasible.[160] As previously discussed, Boulding believes that exact foreknowledge of an evolutionary system, social or educational or otherwise, is fundamentally impossible. The future, then, will surprise us. On the other hand, unnecessary ignorance can contribute to unnecessary surprises.

On the one hand, mechanical systems have no surprise in them. On the other hand, total prediction of an evolutionary system will be defective: "Even if we knew everything that had happened before the present, a sufficient pattern would not emerge."[161] Development (i.e., "wallpaper") systems and equilibrium systems are more predictable than evolutionary systems, and are less predictable than pure mechanistics. An example of a development system is the egg-into-chicken process/pattern.

In equilibrium systems, a state of the system reproduces itself. In the short run, John is the same person from day to day, a pond is the same from season to season, a gas station continues to have gasoline available day after day. Equilibriums, if sufficiently upset, may cease or may change into other systems. John

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dies (system disintegration); a pond becomes a forest (ecological succession in the biosphere); a gas station becomes a supermarket (ecological succession in the sociosphere).

Humans sometimes consciously make equilibrium systems with explicit feedbacks (e.g., the thermostat). If we can control the future, then we can predict it. Humans seek not only understanding but also control. We need to invent a thermostat for the international system; a movement toward war would trigger counteracting processes. To the extent we detect patterns of ecological succession (e.g., from precivilization/folk-knowledge, to civilization/literary-knowledge, to postcivilization/scientific-knowledge), we have some ability to predict.

The least predictable system of all is evolutionary. The theory of evolution is hindsight, not foresight. Both evolutionary "up-ness" and entropic "down-ness" agree: The movement of time is irreversible. However, if evolution continues, it seems reasonable to predict at least some increase of some kind in knowledge or complexity. "The nature of that complexity, however, because it is itself an information system, cannot be known in advance, at least by an organism with a merely human capacity for knowing things."[162]

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A systems break, unpredicted or unpredictable, is a great humbling experience for futurists. The parameters of the system suddenly change, apparently without warning. Is the new trend temporary or long-term? Only long after the event do we know for sure. In some previous cultures, the science trend turned out to be temporary. The hegemony of western culture in today's world is due to a kind of accident: A threshold was achieved, the science trend became long-term, in Europe.

There are two aspects to the growth of knowledge: 1) the transmission or spread of knowledge; and, 2) the research process aimed at producing new knowledge.

> In the very act of transmitting knowledge, new knowledge is often created, which is one reason why universities combine the research and education process. Knowledge is also lost in transmission, which is a kind of negative research, through noise and misunderstanding, which incidently points up the great importance of dialogue and two-way transmissions if the body of knowledge is not to deteriorate in transmission.[163]

Existing knowledge limits and structures its future growth. Hence we have such things as readiness to learn, wasted information input, false learning, feedback failure, and authoritarian thinking. The biogenetic structure of a human being allows tremendous potential for learning. This potential is mostly unrealized. At least for now, it is our knowledge, not our genes, which limit our learning.

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Based on our existing (limited) knowledge we can form flexible, imperfect images of alternative futures and assign each alternative a probability. Further, we may suppose that the dispersion of knowledge has some relation to the size, structure, and funding of the education industry. We may suppose that the production of new knowledge has some relation to the size, structure, and funding of the research establishment. Those involved in knowledge dissemination and knowledge production would do well to re-orient the knowledge industry toward human survival and betterment.

Indeed, lack of interest in the advancement of social science may lead to the extinction of our species. Does the knowledge industry sufficiently realize that present or future knowledge may be used in an interdisciplinary way to help solve or manage important human and world problems? Do academia and society have the necessary desire and will to promote human survival and betterment?

When will we decide to transform social <u>studies</u> (folk-literary knowledge and technology) into social <u>science</u> (scientific knowledge and science-based technology)? (And when will we decide to transform the social <u>sciences</u> into social <u>science</u>?) We previously mentioned the human-made thermostat. Social prediction is easier if we already have the basic social technology

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and will only have to put it into use or expand its use. On the other hand, poor countries tend to lack the knowledge industry or social technology necessary for knowledge dissemination or for social invention and social invention dissemination.

Although the future will surprise us, simple futuristic projections may nevertheless offer insights. Helpful as a corrective is the ability to identify potentials which are being used up. Also, identification of general structural changes may be easier than making precise detailed predictions. One such principle of structure/growth: "the more progressive sectors of the economy tend to shrink in regard to the proportion of the GNP . . . relative to the technologically unprogressive sectors."[164] A twentieth century example of shrinkage (relative to GNP) is agriculture. Today, few Americans are farmers. This suggests expansion (relative to GNP) in non-agriculture (and non-manufacturing) sectors of the economy.

Scientific advance (say, in electronics and automation) is producing a global village. It has already produced nuclear missiles. Accordingly, nation-states are no longer sovereign, but it may take an nuclear war for them to learn the much needed lesson.

The future of the relation between the world superculture and the regional and national cultures is a

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great unknown. Both among and within nation-states, will there be a deep divide between the rich superculture and the poor traditional culture? One can envision the depressed poor (say, 25 percent of the American population or 60 percent of the world population) threatening the supercultural rich. Unfortunately for the poor countries, one can accurately predict (maybe) that in the future technology will advance, but cannot accurately predict precisely which industries or companies a nation-state or a person should invest in today. A region devoted exclusively to agriculture or mining probably has a poor future. A region devoted to government or to defense has a highly uncertain future.

Since the behavior of persons and of nation-states is future-oriented, we have no reasonable choice but to attempt to think about the future, no matter how difficult it may be to responsibly do so. We have already seen the danger to society of thinking about an academic discipline, or the knowledge industry generally, in isolation from society as a whole. Specifically, then, what are we to think about the future of education?

The knowledge industry, including a society's system of formal education, should always plan to be surprised. In addition, consider that new social inventions, directly and indirectly, often have considerable impact on the educational system. In the

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past, such new technologies have included conscription, universal compulsory education, the income tax, social security, the corporation, insurance, socialist nation-states, and banking. Based on considerations such as these, Boulding suggests that the educational system: 1) Prepare for total surprises; 2) Prepare for unexpected but imaginable possibilities; and, 3) Prepare for the expected. All three futuristic activities suggest, further, that the educational system: 4) Increase research; and 5) Enhance feedback.

Boulding sees at least four educational challenges facing our society: 1) Educate all persons. If we are to respect each person and all cultures, not just middle class cultural values, we may have to create educational subsystems. Those who will be living all of their lives as part of the lower class should not be forced into alienated conformity to middle class values. Instead, the educational system should prepare them to conduct cheerful and useful lower class lives.

2) Change the image of the melting pot society into that of a mosaic society of many subcultures. In mass society, people need identity. Invent a mosaic society and a mosaic of educational systems. This implies a common kind of learning: how to nonviolently manage conflict. Public and private education need to be on a more nearly equal footing. Vouchers may help. We need

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to be open to the restructuring of both society and its system of education.

3) Consider the possibility of a financial crisis in education. Educational taxation in the United States is regressive and inequitable. The formal educational system works unfairly in favor of the rich and the middle class and against the poor. Education is underinvested in. We need new social inventions to invest in a very good investment--education; "access to capital is much easier for material technology than it is for human investment, and we need social inventions to correct this."[165] For example, we might experiment using the market system to promote education instead of education being free to all.

4) Persons are the aim of education. Learning (image modification) is an end, not a means. In our day, education must be practical, oriented toward human survival and betterment. The most important educational problem is that of moral identity (persons as ends). Some identities are obsolete and dangerous. Educators sometimes forget that "frills" (not just "basics") are very important in learning to be a good or moral person. Humans have a need to be needed; educators and researchers are now needed to help solve human problems never previously encountered in history. Human-centered, futuristic educators will seek to understand, research,

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and teach about human problems such as 1) automation and work; 2) nuclear weapons; 3) the rich-poor divide; and, 4) lack of moral identity. In our quest for learning, we must be willing to experiment and to make mistakes.

Boulding asserts his principle of education: "It must never be forgotten that the ultimate thing which any society is producing is people. All other things are intermediate goods, and all organizations are intermediate organizations."[166] If educators hold firmly to this principle, "we can afford to make a great many mistakes, we can afford to be surprised by the future, we can even afford to make some bad educational investments, because we will be protected against the ultimate mistake, which would be to make the educational system a means, not an end, serving purposes other than man himself."[167]

The educational system not only involves teaching but also research.[168] If "1% of the annual cost of the world war industry" were available to Boulding each year over a period of two decades for the purpose of establishing a stable world peace, what tasks would be placed on the research agenda?[169] Boulding identifies at least four tasks for peace research and development:

1) We need research to develop a theory of stable peace. This would involve an explicitly interdisciplinary effort to understand the dynamics of social

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systems and of threat systems. The present international system of unstable peace is no longer acceptable due to the advance of science and science-based technology (nuclear missiles). This task would also involve study of value systems, with special reference to conflict management.

2) and 3) We need research to develop a theory of social and international reality testing. Beyond this, we need research to develop the proper machinery to actually provide quality feedback about the international system. "We have already come a long way toward adequate information processing in economic systems with the development of national income statistics and we almost certainly now have the technical knowledge to do this in the international system."[170]

4) Integrative or legitimizing processes must be researched and developed. We can identify with our family and our country--but also with the world community.

> The building of integrative structures requires a technology of its own, not only in the form of social inventions (such as missions, peace corps, cultural exchange, etc.) but perhaps even in the physical and biological environment of the social system. Could there be, for instance, "weapons of peace" and if there were, what would they look like? Is there any way in which threats can be used integratively to replace the threat system itself by something better?[171]

According to Boulding we also need to learn how an underdeveloped country may become a developed country;

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this is highly important to human survival and betterment, but something we presently know little about. If the world social system is not problem-solving, then we will not have a world of stable peace. If each action or problem-oriented program had, say, half its funds devoted to research and development, with an emphasis on feedback, the results would be depressing in the short run but cumulative in the long run.

We have to train peace researchers and educators on an ongoing basis. This would seem to be an important appropriate task for a university. Indeed, peace research is part of a larger task: getting us successfully through the great transition from civilization to postcivilization. The human task, the educational task, the task of the university, then, should be the teaching-learning and research-development of the great transition to postcivilization. We need new images, new learnings, new social inventions.

To get us into a high-technology, stable world, Boulding suggests three general areas of research: 1) peace research, including the four tasks explained above; 2) general sociosphere research, including world economic betterment and population management; and, 3) research to develop a high-level material technology which would be environmentally sustainable long-term.

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The United States budget for its war industry is perhaps only slightly larger than the budget for its schooling industry.[172] Both of these American industries reside mostly outside the system of market economics. Socialized industries depend on taxes for funding. One may, Boulding says, think of the schooling industry as a subset of the education industry, and of the education industry as a subset of the knowledge industry. The knowledge industry, involving human communication, makes up perhaps 25-30 percent of the American economy. The education industry, involving human learning, makes up perhaps 15-20 percent of the American economy. And the schooling industry, involving formal education, makes up perhaps 5-10 percent of the American economy. The American system of formal education (the schooling industry) produces five products: 1) Knowledge; 2) Skills; 3) Custodial Service; 4) Certification; and, 5) Community Action.

1) Knowledge. As one learns, one's image of the world changes, hopefully becoming more realistic. Formal schooling takes us beyond our own personal experiences and introduces us to other experiences and to the whole world. It takes us far back in time. "Examinations, we all know, are imperfect samples of the knowledge of any one person, but they are usually better than nothing."[173]

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2) Skills. Having knowledge does not mean one is skillful. But if one is skillful, one has knowledge, although it may be nonconscious. Practical morality, "the know-how of getting along in the particular society in which one is placed," is "clearly a part of schooling."[174]

3) Custodial Service. The childsitting function is economically important even if the tasks of formal schooling are primarily to produce knowledge and skills. Schooling keeps children off the streets and segregates them from adult society. This segregation produces a youth culture which easily slips into pathology. It also frees the parents of children for productive pursuits: "by the end of the summer the willingness of adults to get children back to school is considerably augmented. A wise school district indeed will always put up its tax votes just before Labor Day."[175] Until recently, formal education was only for the elite. Yet universal education has not led children to value education.

4) Certification. "The only physical product of the teacher is a grade sheet and the only physical product of the school or college is a piece of paper."[176] By valuing diplomas and degrees too much--instead of actual knowledge and skills--societal pathologies may develop. On the other hand, societies need reward structures to function properly.

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5) Community Activity. The school may provide a focus for community pride and various community activities. This would seem to be a rather positive product of schooling.

The American schooling industry provides rather peculiar products, but it is also rather peculiar in that, for the most part, it operates outside the market economy. Via a grant (taxation), society provides its children with a grant (education). Even in the case of a private institution, you have a parent granting to a school money and granting to a child schooling. Lack of feedback, of which this is an example, often leads to pathologies.

In terms of advances in productivity, formal schooling is unprogressive. Lack of productivity, however, is not pathological unless increase in productivity is feasible. Misguided attempts to increase productivity can cause pathologies in the educational system, including mislearning, lack of learning, and mediocre learning at the personal, national, and world levels. Perhaps "the main problem of the schooling industry is how to keep out of it those teachers who have negative productivity and who destroy the incentives and the identity of their students."[177]

As previously indicated, certification is one product of formal schooling, for good and ill. Yet it

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seems to operate independently from issues of productivity. Even though Harvard and UMC may indeed be equivalent in knowledge and skills production, the certifications are unequal--prestige rather than productivity is the primary factor.

Presumably a major part of the problem of educational productivity is that we have an inadequate theory of human learning: "We know it may be discontinuous; that it exhibits problems of 'readiness' rather like the imprinting phenomenon that is well documented in some animals; that it is related to the system of rewards and punishment in the perception of payoffs; that knowledge tends to grow towards the payoffs."[178] On the other hand, if a school were to increase its actual productivity, this would not lead it to an increased share of consumers/students. Yet another difficulty is that good teachers are unable to pass on their skills to other teachers, or so it seems. Boulding discusses three approaches to increasing the productivity of schooling: 1) the commercial approach; 2) the voucher plan; and, 3) the economic-structural perspective.

1) The Commercial Approach. Education is a business, and the key word is accountability. This is the claim, yet learning to be a learning person differs from the fattening of hogs for slaughter. Schooling as an assembly line with short-run objectives is disastrous

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in the long run. Instead of assembly line, think in eiconic and ecodynamic terms; each school is a community, each classroom is an environment, and each student has a worldview, no matter how imperfect. It is the total and long-term evolution of the learner which counts. The commercial atmosphere of short-run, clearly-stated objectives differs from the educational environment we associate with learning to be an autonomous, responsible person.

2) The Voucher Plan. The GI Bill of Rights is an example of the voucher plan. Schools compete for students and students are free to choose. It may be argued that the voucher plan would allow too much variety and fracture society. On the other hand, perhaps now is the time to learn to tolerate diversity, with educational conformity coming only through the process of the licensing of approved schools. Although there are plausible arguments on both sides, it would seem that some experiments here are in order.

3) The Economic-Structural Perspective. The present system is based on grants in the form of taxation. One perspective, then, is to effectively increase educational taxes. Such a system or perspective may run into difficulties. Only a segment of the population has children of school age. Moreover, the older age segment of our voting population is increasing.

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It seems, then, that implementation of the taxation perspective, the voucher plan, the commercial approach, or any optimum mix thereof, even given unrealistically optimistic assumptions, would be an inadequate response to America's upcoming educational challenge. An alternative economic-structural perspective to the present one is called for. In addition to a grants (taxation) economy, Boulding suggests that the government widen its "public exchange economy."

The proposal of Professor Killingsworth, discussed above in the section entitled "The Financing of Education," would significantly modify the present system: "at present the finance of education comes far too much out of regressive local taxes, especially property taxes, so that all too often it is the poor who are really subsidizing the education of the rich and the middle class."[179] It seems that American education, in the last third of the twentieth century, will face substantial economic difficulties unless something like the Killingsworth proposal is properly implemented. The reader is referred to the previous section which discusses the Killingsworth alternative, for more details.

It probably makes more sense to apply the Killingsworth perspective to colleges and universities than to elementary and secondary schools. The reason for

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this is that we want to educate all Americans through the high school level, the ticket to membership in our society, so to speak. There is a standard educational base necessary to function as an autonomous, responsible person in today's world regardless of one's profession or specialization. This is a legitimate function of the grants economy.

There is, however, a limit to what the schooling industry can accomplish even at its reformed best. Talk of a great society or a great school system may make some feel better, but, in this case, such cheap talk is dangerous, at least if one expects immediate results. For example, much (nonformal) education takes place in the family. Unfortunately, the negative synergistic effect of poverty, large families, and lack of education is great. "This effect is probably more significant in determining the distribution of education and even its total quantity than all the reforms we might make in the schooling industry."[180] Accordingly, it is necessary to look outside the schooling industry for solutions to our educational problems. Otherwise even teachers and educators may be tempted to educational despair and desperation. Educational research directed at developing an adequate theory of human learning seems "to be an area where a substantial intellectual effort would have very substantial results; I myself would put it as virtually

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the highest priority of our society in the next generation."[181]

As we look outside the educational system, we find it embedded in a culture in crisis.[182] Indeed, the whole human species is now in a crisis or watershed epoch. There is no longer any place to expand on this planet. This may lead to conflict: no more land for isolation, no more economic growth for all, no more redistribution of income to the poor. If someone in a economically stationary society goes up, someone else must come down; this is not so in the case of an economically growing society. If economists have failed, so far, to solve the problem of economic development, they have also failed to solve the problem of full employment without inflation. While in recent decades economists have been successful in helping the United States defend itself against depression, this defense is not failsafe.

The great purpose of education for children and youth is to enhance the odds for their living, over the next half-century or so, useful, creative, and happy lives. Accordingly, the image all persons, particularly educators, have of the next several decades strongly influences our perception of educational needs. If our image is imperfect, as it almost certainly is, then our attempt to make education relevant will be imperfect.

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Learning to learn, then, is more important than learning details of questionable relevance. This means that 1-R) reading and literacy; 2-R) writing and communication skills; and, 3-R) arithmetic and mathematics are indeed educational basics.

Intellectual growth entails not only knowing-more but also knowing-differently. Profound learning restructures our knowledge and requires us to unlearn. Unlearning and learning go hand in hand. Unlearning obsolete or false knowledge almost requires an active will to unlearn. Failure to unlearn in a rapidly changing world spells disaster.

Historically, liberal education meant education for the elite decision-makers. Today, it seems to mean general education as distinguished from specialized training. Without specialization, growth of the noosphere would be severely limited. One way to formulate this question is to ask: What is it that "everyone" or "50 percent" or "no one" should know? (Perhaps no one else should know certain matters of personal privacy.) This question can be refined further by asking it according to age or grade or prerequisite requirements. A mature "philosopher should ideally know everything there is to know, which is perhaps one reason why the advance of knowledge has led to a decline in philosophy."[183]

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Formal education would seem to have a special role in introducing students to "gateway" or basic knowledge. Without opening certain gates, certain areas of knowledge will be largely unseen and unavailable. This would seem to be a partial vote against undirected and independent learning. At the same time, "the student sent away with the textbook and told not to bother the teacher until he has finished it, will often do as well or better in the examination than those students over whom the teacher has brooded with all the devices of modern educational technique."[184]

Like the baboon, but unlike the lion, humans are curious creatures. Without proper rewards, however, curiosity does not lead to knowledge or to reality-testing. A gossip, for example, is perhaps both very close to and very far from being a scientist. Fortunately, the rise of science was able to legitimize curiosity and veracity. On the other hand, pure curiosity is more dangerous than the gossip and will literally kill the cat, perhaps via drug-induced suicide. Like student motivation, the question of teacher evaluation is a puzzle. Moreover,

> identifying and eliminating the teacher, at all levels of the system, who out of his own personal needs of aggrandisement uses his position of authority to cut down the student and destroy both his curiosity and his identity . . . is a problem that for the most part we have simply refused to face, especially in an age of tenure.[185]

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Whether via child-raising or formal education or otherwise, one's identity may be damaged. Identity damage, including its reproduction or contagion, may be the greatest disease in the sociosphere. Like the womb for the fetus, in education we want to protect the alien being until it matures into an autonomous, responsible member of society. Speaking of the "social cancer" of physical abuse and of identity damage to children caused by parents and teachers, Boulding asks: "to what extent does the apparatus that protects the social fetus also protect the social cancer?"[186]

Since the subcultures of children and youths have pathological tendencies, education should teach them to discriminate between the truly good and the truly bad--and not to discriminate based on class, sex, race, or occupation. No period of life should be idealized; no period of life has a future. A society of half elite (college graduates) and half non-elite (not college graduates) is new to human history. Will formal education separate society into hostile groups, whether it turns out half-half or 75 percent elite--25 percent proletariat?

It is healthy and realistic to be confused as to what liberal education should be. We should look at possible problems of the present and future, not at inflexible blueprints. Such a sufficiently humble

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liberal artist may entertain three kinds of learnings: Sensitization means that one is not self-centered but is sensitive and empathic toward others. Mondialization means that one is sensitive toward the whole world, including its rich variety of cultures and subcultures. Futurization means that one is sensitive toward the future, and flexible in one's never-ending learnings. Boulding suggests that a good motto for education would be: "Who knows only his own generation remains always a child."[187]

Now that we have looked at education in general, and general education in particular, let us next focus on the university. As we think of the structure and restructuring of education, however, the reader is first reminded of two previous sections above which may be relevant, but whose contents will not be substantially repeated in this chapter below: The two sections are "The Financing of Education" and "The Allocation of Educational Finances." With these relevant cross-references attended to, let us now focus our attention on the university, a central component of the world superculture.

Formal education, including university education, is like haircuts in that it is an unprogressive industry.[188] Moreover, the university is a large-scale nonprofit organization. Its systems of accountability

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are based on simple physical or mechanical models. This means that there is more or less accurate information about some elements of the system, more or less inaccurate information about other elements of the system, and little or no information about some of the more important elements. Such simple financial models are unreliable when it comes to such important matters as teaching, learning, trust, and good will. These models bias university administrators, political decision-makers, and everyone else who attempt to be sensitive to the total and actual state of the system. Stereoscopic or realistic vision under such conditions is impossible, no matter how hard the university president may try.

If we view hierarchy as a series of wastebaskets, we can see that important information is often unavailable to the more powerful decision-makers. Informality and redundancy then become unusually valuable, a plus, not a minus, for the system. According to Boulding, the ideal university would actively and consciously serve its dialogic role in the world superculture; a major airport would be located approximately 30 miles away. The university would not underestimate the necessity of financial backing and of gradually building up a larger and larger reserve of liquid assets. The university must actively seek grants, both governmental and non-governmental. (The market or

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exchange economy is also an element.) Many grants are not dependent on performance.

Perhaps the old notion of a university as a community of scholars is being replaced by the idea of the university as a status symbol helpful in gaining grants for oneself. The American university is a corporation; this tends to undermine a sense of responsibility to the university on the part of the professors. The student is a partial-member and a partial-customer of the university. After a few months or a few years, students leave. Also there is the question of whether the university is a sanctuary or a part of the city. Perhaps universities should develop more flexible or graduated means of deterence, including prayer or meditation chambers as a substitute for jails.

If the high school diploma is a general confirmation that one is a member of our society, a Ph.D. degree is an ordination into special status.[189] (Beyond this, nobility may be granted by the National Academy of Sciences, the American Academy of Arts and Sciences, or the American Philosophical Society.) The pressures of graduate study lead students to complete intellectual feats they might otherwise never attempt. Also in graduate education, one may experience apprenticeship, a valuable function, rather than mere schooling. More important than the degree are the letters of reference

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from the student's professors. But a good letter requires that "a professor know the student well, and this is expensive."[190]

The popular forum tends toward the tantalizingly plausible, the academic discipline toward critical analysis. The departmental subculture is all-important for the graduate student, but what should constitute the ideal parameters of conformity and dissent is a puzzle. One always suspects that some of those who failed to gain their degree, for instance, should have received it. One overlooked area is the importance of continuously educating the faculty, including enhancement of communication among faculty. "There should be a principle of university administration that if you take care of the education of the faculty, the education of the students will take care of itself."[191] Team teaching is too often ignored as a potential way to educate faculty. Faculty seminars would also be educational, as are sabbaticals.

The payoffs to professors are for being specialists, not generalists. And, indeed, there is always the danger that interdisciplinary will become undisciplined. But these are not good excuses for insulting interdisciplinary generalists: "the business of the university is to study the universe, not to be an aggregation of hireling specialists."[192] Philosophy, of

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all disciplines, should study the universe; instead, it has chosen to become a specialty. The ideal university would be filled to its golden mean with informality, waste, extravagance, inefficiency, and redundancy. Biologists call this flexibility: the most fit do not survive. It is because of such extravagances that today we have such things as sexual reproduction and science.

Accountability is a problem, in part because one thing education is not is a single number or linear dimension. Creative learning suggests mistakes and toleration. The university should see itself as a great experiment in need of many feedbacks. At the same time, the university should actively and constantly educate the public and their political decision-makers of the dangers of educational efficiency and the merits of redundancy, freedom, trust, and experimentation.

In the last third of the twentieth century we must learn the difficult business of how to handle educational retrenchment or economic decline. Part of the answer may be to emphasize quality instead of quantity. For example, a specific university may decide it wants fewer doctoral programs yet more master's programs, all of high quality. Another possibility would be a program or set of programs offering post-master's studies and degrees in tandem with business or government employers; the degree might take ten or twenty years to complete. Another part

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of the response should be to become more interdisciplinary; the economic and political pressures as perceived, however, may cause the reverse response. Perhaps part of the response should be an increase in the number of research institutes, including of course interdisciplinary ones, as part of the university system. Such institutes would provide variety and new elements to the system, offsetting the sins of the isolated and secure departments.

Like John Kenneth Galbraith, Boulding believes intellectuals and universities should take more responsibility in advancing human survival and betterment.[193] There is a very real sense in which the university, like science, knows no national or religious boundaries. On the other hand, it is the local culture which founds and finances universities. But the university is no longer simply a glorified trade school.

The uniform world superculture is exemplified by universities, science, newspaper offices, television stations, automobiles, and airports. The superculture may be characterized as islands in the local culture. At some point educators and educational institutions decide in favor of truth instead of local (e.g., national or church) power. Teachers are not mere employees or machines, but (potentially) responsible and independent

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persons in quest of truth. Education is about revision, not dogma.

The university is a focal point of conflict between superculture and local culture. In a case of conflict, however, the superculture is not always right and the local culture wrong. Indeed, the superculture is a partial or incomplete culture; it knows more about means or methodologies than about ends or goals. Science is universal, but scientists are particular persons.

On the one hand, the superculture does not supply a person with enough identity. On the other hand, the local culture of nations and religions does not allow one to be simply a person rather than a national citizen or a religious believer. For example, as citizens of a specific nation-state, we, the otherwise truthful, critical professors, "defend our old errors with tenacity because our identity is deeply bound up with them and we condone violence, deceit, secrecy, and threats in a way that we would never dream of doing in the scientific community."[194]

An incomplete superculture will not supercede local culture, but it does modify it. For example, in the nineteenth century, medical doctors resisted the supercultural takeover of medicine. And today parents often rely on books instead of relatives to learn about childrearing. The conflict between the nation-state and

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the superculture is often suppressed. In Germany, it was religious believers, not university professors, who stood up against Hitler. In such pathological situations, science is helpless, for one value science lacks is courage.

The university has roots both in science and in universality. Accordingly, the (non-scientific) humanities are also vital parts of the university. Since the university is the primary interface between superculture and local culture, it has the obligation of mediation. The dangerous dependence of the university on grants (whether governmental or non-governmental), accordingly, should prod us to look for financial and structural alternatives (previously discussed).

Today the university community is a weak one; its individual scholars go not to the university but to outside grantors for funding. If anyone, either scholars or administrators, really cared, this could be changed. For example, take power from the trustees and the administrators and give it to the faculty. Whether the faculty would really want or take it is a question. Another possibility: Give the grants to universities instead of to scholars. Without strengthening the university community, local culture (nationalistic, religious, etc.) will tend to invade the university more and more.

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These considerations do not make one optimistic about the future of the university. Nevertheless, let us help the future surprise us. There is a logic to knowledge increase (i.e., education), to science, and to universality. The university appears to be a likely or suitable place for fusing the partial values of science with the integrative necessities of local culture. The realization, nature, and structuring of the fusion depend on whether scholars and universities have the will to accept greater responsibility for world betterment.

Such responsibility includes the learning of persons and the macrolearning of societies; it encompasses the family, the schooling industry, and the economic and political system. In accepting leadership for the total macrolearning of the entire sociosphere, the university faces dangers and temptations such as corruption, conformity, and power.

> In the absence, however, of any other agency which today seems capable of performing the function of spiritual leadership towards the universal society--for both state and church are too much infected with the parochial, too little enlarged to the universal--it may be that the university will have to take on this role by default. If it can do so with a clear-sighted humility we may be in better shape to deal with the dangerous future than if it accepts the role blindly and reluctantly.[195]

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NOTES

1. The 31 articles are identified in the following 31 notes: 72; 73; 74; 76; 78; 83; 89; 92; 96; 98; 103; 105; 108; 111; 116; 120; 125; 127; 131; 133; 137; 146; 151; 155; 160; 168; 172; 182; 188; 189; and, 193.

2. Much of this section is based on Kenneth E. Boulding, The Image: Knowledge in Life and Society (Ann Arbor, MI: University of Michigan Press, 1956), 3-31.

3. Boulding, The Image, 24.

4. Ibid., 28.

5. Ibid., 29.

6. Much of this section is based on Boulding, The Image, 32-46.

7. Boulding, The Image, 35.

8. Ibid., 37.

9. Ibid., 40.

10. Ibid., 45.

11. Ibid., 44.

12. Ibid., 45.

13. Much of this section is based on Boulding, The Image, 47-63.

14. Boulding, The Image, 47.

15. Ibid., 48.

16. Ibid., 49.

17. Ibid., 50.

18. Ibid., 51.

19. Ibid., 52.

20. Ibid., 53.

21. Ibid., 54.

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22. Ibid., 52.

23. Ibid., 60.

24. Ibid., 61.

25. Much of this section is based on Boulding, The Image, 64-81.

26. Boulding, The Image, 68.

27. Ibid., 74.

28. Ibid., 78.

29. Ibid., 79.

30. Ibid., 81.

31. Much of this section is based on Boulding, The Image, 132-63.

32. Boulding, The Image, 153.

33. Ibid., 14.

34. Ibid.

35. Ibid., 18.

36. Ibid., 145.

37. Ibid., 145-6.

38. Much of this section is based on Boulding, The Image, 82-96.

39. Boulding, The Image, 84.

40. Ibid., 86.

41. Ibid., 87.

42. Ibid., 90.

43. Much of this section is based on Boulding, The Image, 97-114.

44. Boulding, The Image, 100.

45. Ibid., 103.

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46. Ibid., 107.

47. Ibid., 109.

48. Ibid., 111.

49. Ibid., 112.

50. Ibid., 113.

51. Ibid., 113-4.

52. Much of this section is based on Boulding, The Image, 115-131.

53. Boulding, The Image, 116.

54. Ibid., 120.

55. Ibid., 122.

56. Ibid., 125.

57. Ibid.

58. Ibid., 131.

59. Much of this section is based on Boulding, The Image, 164-75.

60. Boulding, The Image, 164.

61. Ibid., 164-5.

62. Ibid., 165.

63. Ibid.

64. Ibid.

65. Ibid., 166.

66. Ibid., 171.

67. Ibid.

68. Ibid., 172.

69. Ibid., 173.

70. Ibid., 174-5.

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71. Ibid., 175.

72. Much of this paragraph and the seven following paragraphs is based on Kenneth E. Boulding, Collected Papers, Volumes 1-6 (Boulder, CO: Colorado Associated University Press, 1971-85), vol. 6, 39-48. "The Knowledge Exposion" was first published in 1970.

73. Much of this paragraph and the three following paragraphs is based on Boulding, Collected Papers, vol. 4, 77-84. "Secular Images of Man in the Social Sciences" was first published in 1958.

74. Much of this paragraph and the three following paragraphs is based on Boulding, Collected Papers, vol. 3, 127-45. "The Public Image of American Economic Institutions" was first published in 1961.

75. Boulding, Collected Papers, vol. 3, 145.

76. Much of this paragraph and the twelve following paragraphs is based on Boulding, Collected Papers, vol. 3, 323-37. "Verifiability of Economic Images" was first published in 1966.

77. Boulding, Collected Papers, vol. 3, 330.

78. Much of this paragraph and the four following paragraphs is based on Boulding, Collected Papers, vol. 3, 449-55. "Economic Education: The Stepchild Too Is Father of the Man" was first published in 1969.

79. Boulding, Collected Papers, vol. 3, 453.

80. Ibid., 454.

81. Ibid.

82. Ibid., 454-5.

83. Much of this paragraph and the ten following paragraphs is based on Boulding, Collected Papers, vol. 4, 85-104. "The Knowledge of Value and the Value of Knowledge" was first published in 1959.

84. Boulding, Collected Papers, vol. 4, 93.

85. Ibid., 89.

86. Ibid., 98.

87. Ibid., 102.

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88. Ibid., 104.

89. Much of this paragraph and the four following paragraphs is based on Boulding, Collective Papers, vol. 3, 457-66. "The Formation of Values as a Process in Human Learning" was first published in 1969.

90. Boulding, Collective Papers, vol. 3, 462.

91. Ibid., 464.

92. Much of this paragraph and the five following paragraphs is based on Boulding, Collected Papers, vol. 4, 21-32. "Notes on the Information Concept" was first published in 1955.

93. Boulding, Collected Papers, vol. 4, 29.

94. Ibid., 31.

95. Ibid., 32.

96. Much of this paragraph and the four following paragraphs is based on Boulding, Collected Papers, vol. 3, 339-49. "Human Resource Development as a Learning Process" was first published in 1966-67.

97. Boulding, Collected Papers, vol. 3, 345.

98. Much of this paragraph and the twelve following paragraphs is based on Boulding, Collected Papers, vol. 6, 301-18. "The Learning of Peace" was first published in 1974.

99. Boulding, Collected Papers, vol. 6, 313.

100. Ibid., 314.

101. Ibid., 315.

102. Ibid., 317.

103. Much of this paragraph and the five following paragraphs is based on Boulding, Collected Papers, vol. 4, 223-36. "The Place of the Image in the Dynamics of Society" was first published in 1964.

104. Boulding, Collected Papers, vol. 4, 235-6.

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105. Much of this paragraph and the eight following paragraphs is based on Boulding, Collected Papers, vol. 5, 179-93. "Conflict Management as a Learning Process" was first published in 1966.

106. Boulding, Collected Papers, vol. 5, 187.

107. Ibid., 192.

108. Much of this paragraph and the ten following paragraphs is based on Boulding, Collected Papers, vol. 4, 373-90. "The Learning Process in the Dynamics of Total Societies" was first published in 1967.

109. Boulding, Collected Papers, vol. 4, 388.

110. Ibid., 390.

111. Much of this paragraph and the nine following paragraphs is based on Boulding, Collected Papers, vol. 5, 237-53. "The Learning and Reality-Testing Process in the International System" was first published in 1967.

112. Boulding, Collected Papers, vol. 5, 243.

113. Ibid., 247.

114. Ibid., 248.

115. Ibid., 253.

116. Much of this paragraph and the five following paragraphs is based on Boulding, Collected Papers, vol. 2, 301-8. "Knowledge as an Economic Variable" was first published in 1964.

117. Boulding, Collected Papers, vol. 2, 303.

118. Ibid., 307.

119. Ibid., 308.

120. Much of this paragraph and the nine following paragraphs is based on Boulding, Collected Papers, vol. 2, 365-79. "The Economics of Knowledge and the Knowledge of Economics" was first published in 1966.

121. Boulding, Collected Papers, vol. 2, 368.

122. Ibid., 375.

123. Ibid., 376-7.

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124. Ibid., 377.

125. Much of this paragraph and the eight following paragraphs is based on Boulding, Collected Papers, vol. 3, 383-91. "Grants Versus Exchange in the Support of Education" was first published in 1968.

126. Boulding, Collected Papers, vol. 3, 390.

127. Much of this paragraph and the ten following paragraphs is based on Boulding, Collected Papers, vol. 3, 503-31. "Factors Affecting the Future Demand for Education" was first published in 1970.

128. Boulding, Collected Papers, vol. 3, 518.

129. Ibid., 528.

130. Ibid., 530.

131. Much of this paragraph and the three following paragraphs is based on Boulding, Collected Papers, vol. 3, 195-200. "The Misallocation of Intellectual Resources" was first published in 1963.

132. Boulding, Collected Papers, vol. 3, 199.

133. Much of this paragraph and the six following paragraphs is based on Boulding, Collected Papers, vol. 3, 533-52. "The Misallocation of Intellectual Resources in Economics" was first published in 1971.

134. Boulding, Collected Papers, vol. 3, 535-6.

135. Ibid., 539.

136. Ibid., 552.

137. Much of this paragraph and the eleven following paragraphs is based on Boulding, Collected Papers, vol. 4, 429-35. "What Can We Know and Teach About Social Systems?" was first published in 1968.

138. Boulding, Collected Papers, vol. 4, 431.

139. Ibid., 432.

140. Ibid., 433.

141. Ibid.

142. Ibid., 434.

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143. Ibid.

144. Ibid., 435.

145. Ibid.

146. Much of this paragraph and the eight following paragraphs is based on Boulding, Collected Papers, vol. 5, 49-62. "National Images and International Systems" was first published in 1959.

147. Boulding, Collected Papers, vol. 5, 55.

148. Ibid., 56.

149. Ibid.

150. Ibid., 61-2.

151. Much of this paragraph and the five following paragraphs is based on Boulding, Collected Papers, vol. 5, 121-34. "The Role of Law in the Learning of Peace" was first published in 1963.

152. Boulding, Collected Papers, vol. 5, 131-2.

153. Ibid., 132.

154. Ibid., 133.

155. Much of this paragraph and the following paragraphs remaining in this section is based on Boulding, Collected Papers, vol. 4, 469-90. "The Task of the Teacher in the Social Sciences" was first published in 1970.

156. Boulding, Collected Papers, vol. 4, 478.

157. Ibid., 480.

158. Ibid.

159. The nine teacher-evaluation self-queries (including all quotes) come from Boulding, Collected Papers, vol. 4, 486-90.

160. Much of this paragraph and the twenty following paragraphs is based on Boulding, Collected Papers, vol. 4, 327-43. "Expecting the Unexpected: The Uncertain Future of Knowledge and Technology" was first published in 1966.

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161. Boulding, Collected Papers, vol. 4, 330.

162. Ibid., 332-3.

163. Ibid., 334.

164. Ibid., 338.

165. Ibid., 342.

166. Ibid., 343.

167. Ibid.

168. Much of this paragraph and the six following paragraphs is based on Boulding, Collected Papers, vol. 5, 149-54. "Needs and Opportunities in Peace Research and Peace Education" was first published in 1964.

169. Boulding, Collected Papers, vol. 5, 151.

170. Ibid., 152.

171. Ibid., 153.

172. Much of this paragraph and the fifteen following paragraphs is based on Boulding, Collected Papers, vol. 4, 569-84. "The Schooling Industry as a Possibly Pathological Section of the American Economy" was first published in 1972.

173. Boulding, Collected Papers, vol. 4, 572.

174. Ibid., 573.

175. Ibid., 574.

176. Ibid., 575.

177. Ibid., 580-1.

178. Ibid., 579.

179. Ibid., 583.

180. Ibid., 584.

181. Ibid.

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182. Much of this paragraph and the eight following paragraphs is based on Boulding, Collected Papers, vol. 6, 129-43. "The Liberal Arts Amid a Culture in Crisis" was first published in 1972.

183. Boulding, Collected Papers, vol. 6, 137.

184. Ibid.

185. Ibid., 139.

186. Ibid., 140.

187. Ibid., 142.

188. Much of this paragraph and the two following paragraphs is based on Boulding, Collected Papers, vol. 3, 413-27. "The University as an Economic and Social Unit" was first published in 1968.

189. Much of this paragraph and the four following paragraphs is based on Boulding, Collected Papers, vol. 6, 625-43. "Graduate Education as Ritual and Substance" was first published in 1980.

190. Boulding, Collected Papers, vol. 6, 630.

191. Ibid., 633.

192. Ibid., 634.

193. Much of this paragraph and the eight following paragraphs is based on Boulding, Collected Papers, vol. 5, 281-89. "The University and Tomorrow's Civilization" was first published in 1967.

194. Boulding, Collected Papers, vol. 5, 286.

195. Ibid., 289.

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CHAPTER 4

CRITICAL ANALYSIS

As preparation for the present study generally and the analysis below specifically, a search of the literature was initiated. Later it will be explained how the results of the literature search shall serve as an integral component in the very methodology of the study.

Literature Search on Boulding

An excellent and thorough bibliography of the works of Boulding exists; compiled by Vivian L. Wilson, it is updated by her on a regular basis.[1] The literature search on Kenneth Boulding--computer databases rather than printed indexes were chosen--simply employed the word "Boulding." Then all citations referring to a different Boulding were excluded from the list; next all duplicate citations were removed/consolidated; and, finally, all works were excluded with Boulding as author, as were all sound and video recordings, all bibliographies, and all non-English language works.

Given this context, a complete search of 1) the Dissertation Abstracts International (1861-August 1992)

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database of dissertations; 2) the OCLC (copyright 1992) database of books; 3) the Philosopher's Index (1940-March 1992) database of philosophy-related books and articles; and, 4) the ERIC (1966-June 1992) database of education-related books and articles--revealed 24 works more or less related to the philosophy of Boulding. In these or in any other works, no previous Boulding-related study essentially like the present one was found. The 24 works are as follows:

Nine possibly relevant works were located via Dissertation Abstracts International:

1. "Improving Students' Transactional Writing Through Cognitive Strategy Intervention" by Kathleen S. Giles, is a 1989 doctoral dissertation, 115 pages in length. Based in part on Boulding's "image" theory of learning, four hypotheses are tested relative to improvement in A) writing abilities; B) language usage; C) reading comprehension; and, D) critical thinking.

2. "Work Images and Clozentropy: A Communication Study of Engineers at Three Levels of Professional Development" by Barbara Jean Balog, is a 1986 doctoral dissertation, 200 pages in length. Boulding's theory of "the image" is used in this empirical study to investigate the process of changes in work images among engineers.

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3. "The Rhetoric of Public Theology: A Rhetorical Analysis of the Social Justice Wing of the United States Catholic Church" by Steven Roger Goldzwiq, is a 1985 doctoral dissertation, 512 pages in length. A kind of methodology, "image analysis" (based in part on Boulding), is developed to interpret discourse about social justice in the U.S. Catholic Church.

4. "Message Preference, World-View Orientations and Alumni Interests" by Mary Ruth Snyder, is a 1982 doctoral dissertation, 166 pages in length. This empirical study used Boulding's theory of "the image" and Stephen Pepper's theory of "world hypotheses" as its conceptual context or framework.

5. "A Civilizational Perspective on World Politics: The Contemporary Chinese Worldview" by Sarah-Ann Smith, is a 1980 doctoral dissertation, 123 pages in length. Among other theories, Boulding's theory of "the image" is used here to examine the Chinese image of the global political world.

6. "The Image Heuristic in Rhetorical Theory" by Douglas Bradley Smith, is a 1979 doctoral dissertation, 214 pages in length. Several theories of "the image" (including Boulding's) are described in this study.

7. "Creative Tension: The Life and Thought of Kenneth Boulding" by Cynthia Earl Kerman, is a 1971 doctoral dissertation, 411 pages in length. This

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biography of Boulding was published in book form in 1974. The book has proven to be of significant value in preparing the present document.

8. "Daniel Bell and Kenneth Boulding on Social and Educational Theory" by Judith Peterson Stevens, is a 1971 doctoral dissertation, 206 pages in length. This study examines the social philosophy and educational theory of each of the two thinkers, and then compares and contrasts the two. This work has proven to be of significant value in preparing the present document.

9. "The Economics of Kenneth E. Boulding" by John J. Voynich, is a 1967 doctoral dissertation, 247 pages in length.

Four additional works were located via OCLC:

10. "Is Peace Possible?" by Allison Graves, subtitled "an evaluation of the theories of Kenneth E. Boulding," is a 1987 senior thesis in economics, 59 pages in length.

11. "Analysis of a Stable Peace" by Philip Edward Deberardinis, is a 1985 report which analyzes Boulding's ideas for creating a stable, peaceful world order, 54 pages in length.

12. "The Economist as Social Philosopher: Kenneth E. Boulding and the Good Society" by Charles August Capone, is a 1984 M.A. thesis, 121 pages in length.

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13. "School Boards, Teachers, and Boulding's Model of Conflict" by Eugenia C. Hunter, is a 1970 M.S. thesis in economics, 83 pages in length.

Four additional works were located via Philosopher's Index:

14. The Ways of Peace: A Philosophy of Peace as Action by Gray Cox, is a 1986 monograph which draws on a number of thinkers to develop and defend the author's own theory of peace.

15. "On Understanding Awareness" by Charles W. Rusch, is a journal article of 23 pages. The epistemologies of Boulding, Bruner, Kaplan, Piaget, Sartre, and Werner are examined and synthesized.

16. "Humanism and Educational Relevance" by Henry Winthrop, is a journal article of 4 pages. The ideas of 5 thinkers, including Boulding, are used to examine the meaning of "educational relevance" and of "alienation."

17. "The Real Swingers" by Erling Skorpen, is a journal article of 5 pages in length. The real swinger is potentially every person; the philosophical anthropology of Boulding and of Jaspers are compared.

Seven additional works were located via ERIC:

18. "One-Semester Introductory Economics Textbooks: Echoes and Choices" by Jean Shackelford, is a journal article of 33 pages. A number of introductory

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economics texts are examined, using Boulding's ideas about textbooks.

19. "Systems Theories of Personality: Implications from Boulding's Writings" by David Lester, is a journal article of 3 pages. Boulding's ideas about general systems are applied to the study of personality.

20. "On Imaging the Future: The Secular Search for 'Piety'" by Jane Blankenship and Janette Kenner Muir, is a journal article of 12 pages. Boulding's epistemology is examined in relation to Kenneth Burke's ideas regarding "piety."

21. A Clash of Symbols: An Analysis of Competing Images and Arguments in the AIDS Controversy by Eric Gilder, is a 38-paged professional paper presented in 1987. A thoughtful response to the AIDS epidemic would incorporate Boulding's model of threat-exchange-integration.

22. "Toward an Improved Understanding of the Organizational Nature of Schools" by Derek J. Allison, is a journal article of 28 pages. Boulding's epistemology offers hope if we wish to work together in understanding the organizational nature of schools.

23. The Reformation of Schooling by Louis Rubin, is a "meta" report about educational research, 28 pages in length. Certain themes identified by Boulding and

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others would make a fruitful beginning for research development aimed at school reform.

24. "A Theoretical Exploration of the Function of the Image in Communication" by Robert L. Schrag, is a journal article of 8 pages. Kenneth Boulding's The Image and Daniel Boorstin's The Image are synthesized.

In addition to the 24 works listed above, Boulding has recommended the following:

25. "Kenneth Boulding's Ecodynamics" edited by Harvey Wheeler and James F. Danielli, is a 1981 "symposium" of ten sets of commentary plus Boulding's response, 50 journal pages in length. (The ten authors of the commentary were David P. Barash, Joseph S. Berliner, Paul Bohannan, Earl Cook, Herman E. Daly, Hazel Henderson, Ezra Mishan, Glendon Schubert, Albert Somit, and Gordon Tullock.) The symposium has proven to be of significant value in preparing the present document.

The works identified above as item numbers 1, 3, 4, 5, and 10 were unavailable from the University of Missouri library system even though each was specifically requested via interlibrary loan. Accordingly, these five works have been excluded from the present study. (Based on the apparent nature of four of the five works and their abstracts in Dissertation Abstracts International, however, one is tempted to infer it likely that item

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numbers 1, 3, 4, and 5 would offer little or no criticism of Boulding.)

As the next stage of the methodology of the present chapter, the 25 works listed above were consulted, to the extent available, with critical purpose in mind. The findings for this stage of the investigation are as follows:

1. The work identified above as item number 1 was effectively unavailable, as previously explained.

2. The work identified above as item number 2 offers no significant criticism of Boulding.

3. The work identified above as item number 3 was effectively unavailable, as previously explained.

4. Item number 4 was effectively unavailable, as previously explained.

5. Item number 5 was effectively unavailable, as previously explained.

6. Item number 6 offers no significant criticism of Boulding.

7. The 1974 published book, as distinguished from the 1971 dissertation, version of this work (identified above as item number 7) was chosen for use in the present investigation. Although the general tone is very positive toward Boulding, the work will nevertheless be studied further for its criticism or apparent criticism

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of Boulding. Hereinafter the work is referred to simply as Kerman.

8. This work (item number 8) will be studied further for its criticism of Boulding. Hereinafter the work is referred to simply as Stevens.

9. This work will be studied further for its criticism of Boulding. Hereinafter the work is referred to simply as Voynich.

10. This work was effectively unavailable, as previously explained.

11. This work will be studied further for its criticism of Boulding. Hereinafter the work is referred to simply as Deberardinis.

12. This work will be studied further for its criticism of Boulding. Hereinafter the work is referred to simply as Capone.

13. This work will be studied further for its criticism of Boulding. Hereinafter the work is referred to simply as Hunter.

14. This work will be studied further for its criticism or apparent criticism of Boulding. Hereinafter the work is referred to simply as Cox.

15. This work offers no significant criticism of Boulding.

16. This work offers no significant criticism of Boulding.

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17. This work offers no significant criticism of Boulding.

18. This work offers no significant criticism of Boulding.

19. This work offers no significant criticism of Boulding.

20. Item number 20 offers no significant criticism of Boulding.

21. Item number 21 offers no significant criticism of Boulding.

22. Item number 22 offers no significant criticism of Boulding.

23. The work identified above as item number 23 offers no significant criticism of Boulding.

24. The work identified above as item number 24 offers no significant criticism of Boulding.

25. The work identified above as item number 25 will be studied further for its criticism of Boulding. Hereinafter the work will be subdivided into its ten commentaries/commentators (see above) and referred to accordingly as Barash, Berliner, Bohannan, Cook, Daly, Henderson, Mishan, Schubert, Somit, or Tullock, as appropriate.

The findings for this stage of the investigation may now be summarized.[2] Seventeen works offering criticism or apparent criticism of Boulding have been

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identified. These 17 works are as follows: Barash; Berliner; Bohannan; Capone; Cook; Cox; Daly; Deberardinis; Henderson; Hunter; Kerman; Mishan; Schubert; Somit; Stevens; Tullock; and, Voynich.

Next each of these 17 works was examined further for the express purpose of precisely identifying specific discourse-units critical of Boulding. Based on the 17 works, 137 such discourse-units were identified (see below).

David P. Barash as Critic

Discourse-Unit #1

According to Barash, page 146: "We have 46 chromosomes, not 48."

Discourse-Unit #2

Barash, page 146: "Boulding also claims that his 48 chromosomes indicate that he had 48 ancestors--I have never before encountered such a 'one chromosome, one ancestor' hypothesis."

Discourse-Unit #3

Barash, page 146: "He propounds a curious 'law of evolution' that 'complexity increases in terms of differentiation and structure' (p. 10). Sometimes this happens, but not always and certainly no such 'law' is warranted. The recently evolved penicillin resistance of

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hospital bacteria is probably less complex than the much earlier evolution of the mammals."

Discourse-Unit #4

Barash, page 146: "He claims that selection is far more important in the evolutionary process than is mutation--about as defensible as the assertion that heads are more important than tails in making a coin."

Discourse-Unit #5

Barash, page 146: "Similarly, he thinks consistently in population and species terms, rather than the fitness of individuals, and is thus led into the trap of unwitting typologic and group selection thinking."

Discourse-Unit #6

Barash, page 146: "He relies on 'survival value' rather than reproductive success, and places altogether too much emphasis on catastrophes."

Discourse-Unit #7

Barash, page 146: "He assumes that animal populations are limited by territoriality and that species can evolve themselves into extinction, via sexual selection."

Discourse-Unit #8

Barash, pages 146-147: "His discussion of the 'benevolence/malevolence' continuum (pp. 207-209) assumes

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that the degree of either shown by each interactant will be a function of the benevolence or malevolence of the other. More likely, it will be determined directly by what each interactant receives as a result of his or her behavior; i.e. as a first approximation, we can assume that individuals will maximize their return, call it utility, inclusive fitness, or whatever."

Discourse-Unit #9

Barash, page 147: "Boulding treats 'human artifacts' extensively as following laws analogous to biological evolution, but basically independent of biology. . . . 'The processes by which each generation of human beings learns from the last are far more important than the process by which biological genes are inherited' (p. 123). And again: 'Once we get to the human race noogenetics dominates biogenetics to a remarkable extent. We know very little about the relation between the human genetic structure and the human phenotype . . .' (p. 123). There is a strange contradiction here: granted, we know very little about the relation of human genotype to the final phenotype. That being so, how can anyone flatly circumscribe the relative importance of the former?"

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Joseph S. Berliner as Critic

Discourse-Unit #10

According to Berliner, pages 148-149: "To move from metaphor to theory, however, the initial experience of understanding must proceed to other experiences like prediction or explanation. A proper theory is a tool of thought that enables one to explain or predict events different from those that entered into its formulation. The test of Boulding's contribution to theory is to be found, then, in the last chapters of the book which constitute its application. The question to be asked is whether the theory is actually employed in the analysis of the problems of power and limits, and whether it provides better solutions than would be attained by someone uninstructed in that theory."

Berliner, page 150: "[Boulding's theory has] served as an agenda, so to speak--a list of relevant matters--rather than as a set of propositions from which certain conclusions could be drawn. Which is to say that it is not a theory at all. It is perhaps best described as a paradigm, which is the term that Parsons employed to describe his own effort a generation ago."

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Paul Bohannan as Critic

Discourse-Unit #11

According to Bohannan, page 152: "Money is a simplifying principle that allows further complication. . . . It is the resulting hierarchy of simplifying principles that enables complications to occur, . . . it is the simplifying nature, not the complicating nature, of evolution that makes history. . . . Boulding's discussion of evolution as history is thus not very convincing to me. There is an historical dimension to evolution, but it is merely what in fact happened--when what is interesting is the potentials of what might have happened."

Discourse-Unit #12

Bohannan, pages 152-153: "[Boulding] talks inaccurately about 'societal evolution' when he means 'cultural evolution'. . . . From this [Table 1] I can only assume that Boulding and the anthropologists are in the same degree concerned with the components of the human condition but at very great odds as to how the components should be systematized."

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Charles August Capone as Critic

Discourse-Unit #13

According to Capone, page 30: Boulding's use of the analogy of the earth as a spaceship sometimes leads Boulding to paint a darker picture of the future than is warranted.

Discourse-Unit #14

Capone, page 87: "My contention here is that the tension we have seen in the thought system of Kenneth Boulding between hope and despair for the future of mankind and a world economy of abundance is a result of what we might call an anthropological confusion. Boulding attempts to straddle two mutually incompatible world views."

Capone, page 88: "We have seen that he says there are many roads to the good society, but in other places writes that there is only one way; he sounds utopian in his dream for society while despairing over the possibility of nuclear self-annialation [sic] and geophysical deterioration; man is pictured by him as a being with unlimited potential who can redeem himself from the ills which plague him, but then he is described as having no hope without a particular ethic which most do not ascribe to."

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Capone, page 93: "Boulding the scientist ascribes to this second view [to a God-denying humanism rather than to a God-affirming humanism]."

Discourse-Unit #15

Capone, page 93: According to Capone, Boulding the scientist tends to see human beings as mere units in a society which is deterministic.

Capone, page 94: "He discusses the need for the right social systems (balance of integrative, threat and exchange systems, for example) separate from and predominant over personal characteristics."

Capone, page 94: "Boulding attempts, in this same vein, to dismiss the importance of morals as he allows for the possibility of any economic-political form of organization in the good society."

Capone, page 94: "Without an infinite integration point, i.e., the existence of absolutes in the areas of morals and being," Boulding the scientist falls into the deterministic trap.

Capone, pages 94-95: "The love, heroism, and hunger for the Divine which Boulding ascribes to man in his fullness is utterly meaningless [in scientist Boulding's deterministic world]."

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Discourse-Unit #16

Capone, page 95: "In fact, it is a Kierkegaardian 'leap of faith' by which Boulding can say that through an increase in knowledge society will move ahead to where coercion and exploitation are no longer 'necessary,' because to this point in human history the increase of human knowledge has done anything but shown evidence of eradicating evil and cruelty."

Discourse-Unit #17

Capone, page 96: "He follows a synchretistic approach of inserting Christian principles into his rationalist framework. . . . For example, since hope of reaching the good society is little more than a dream given our discussion to this point, Boulding postulates that the only road to utopia is that which includes the predominantly Orthodox Christian virtues of love, repentance, humility, and meekness."

Discourse-Unit #18

Capone, page 111: "The one truth which destroys Boulding's vision of the good society is that man cannot redeem himself from the ills which plague him. Neither knowledge, nor technology, nor even ethics can set man free from the curse of sin and death that holds sway over him."

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Capone, page 112: "the good society is an eschatological hope which will never be manifest in this Fallen world."

Earl Cook as Critic

Discourse-Unit #19

According to Cook, page 157: "Boulding, in stressing the evolutionary role of mutations in the filling of ecological niches is following neo-Darwinian thought. Recent research . . . appears to demonstrate that mutations play a minor role in biological evolution and, indeed, that new species are not formed by mutagenesis, but a process called gene duplication. Because gene duplication qualifies as a rare event [Boulding emphasizes the importance of rare events], it would be no more than quibbling to criticize the neo-Darwinian paradigm because mutations per se are not the principal evolutionary mechanism. However, the gene-duplication research yields a more subtle and more important message."

Cook, pages 157-158: "In Ohno's view, natural selection conserves rather than creates; no change in environment is required for the conservation of a new species created by gene duplication. Neither the timing nor the success of such a biological accident is environmentally determined; its timing is determined by

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the rate and stage of development of a particular genetic line, and its success by the fact that natural selection tends to conserve by selecting out the malformed, which include most mutants but not those with complete new genes. Of course, an oxygen-bearing atmosphere was required . . . but to maintain that an ecological niche for vertebrates existed since the development of an oxygen-bearing atmosphere, in other words for some hundreds of million of years, would stretch the niche concept beyond the limit of utility."

Cook, page 158: "It appears that a shift in emphasis is called for in the systems paradigm for evolution. The opening and closing of ecological niches does not play such a creative role for the evolutionary accident, a unique event whose timing depends on three factors: the existence of an environment in which the success of the accident is possible; the stage of evolutionary development of the genetic line in which the accident occurs; and the probability of occurrence of that kind of accident, which, in the biological system, depends on population size, generation time and other factors."

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Gray Cox as Critic

Discourse-Unit #20

According to Cox, page 15: "dead bodies are comparatively easy to count. It seems that fairly clear measures of the incidence of war could be constructed. So it seems foolish to mush about with studies of tranquility and harmony when we can define peace simply as the absence of war and get to work."

Cox, page 15: "Such thoughts lead prominent social scientists like Kenneth Boulding to set aside the harmony and tranquility view. Instead, they focus on 'peace in a narrower sense which is easier to understand, more susceptible to specific research, and more susceptible also to recommendations for policy.'"

Cox, page 20: "But conceptions of peace as an absence are attractive for other reasons as well, reasons which are suspiciously profound. The reasons concern dominant ways in which our culture tends to characterize knowledge and human nature--as well as ways in which it institutionalizes distinctively conflict-centered views of human activity."

Cox, page 20: "On the face of it, a very basic rule of logic seems to be violated when peace is defined as some sort of absence. . . . The rule is simply that definitions should be affirmative rather than negative."

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Cox, page 21: According to Cox, Boulding breaks this logical rule.

Cox, page 21: "Philosophers have traditionally taken the goal of a definition to be to accurately state the essence of an idea."

Cox, page 21: "It may be much more difficult to say what a thing is than to say what it is not."

Herman E. Daly as Critic

Discourse-Unit #21

According to Daly, page 158: "I myself have adopted several of these [Kenneth Boulding's] orphaned ideas . . . [including the following idea] in Boulding's (1949) words, ' . . . it is the capital stock from which we derive satisfactions, not from the additions to it (production) or the subtractions from it (consumption).'"

Daly, page 159: "All presentations of this idea are accompanied by caveats to the effect that for some goods it does appear that welfare is a function of the consumption flow itself, and that the whole issue is very tricky. I think it is fair to say that the caveats receive progressively more emphasis and that by the time we get to Ecodynamics we no longer find the kind of strong statement quoted above to the effect that welfare is a direct function of stocks, not flows, and that flows are regrettably necessary costs of maintaining stocks.

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Instead, we are told that 'The truth probably lies somewhere between these two positions.'"

Daly, page 161: "In sum even short-lived or one-use commodities as fuel, food, and musical concerts do not constitute exceptions to the rule that service is yielded by accumulations and that accumulations are physically maintained by flows . . . the 1949 statement quoted is correct as it stands, and the 'difficult' cases are factitious."

Daly, page 162: "When an argument [of the 1949 Boulding] is both inconvenient and incontestable it tends to be ignored" by the experts.

Philip Edward Deberardinis as Critic

Discourse-Unit #22

According to Deberardinis, pages 27-28: Boulding tends not to see the reality of personal and group self-interests, focusing instead on the good of the whole human species.

Discourse-Unit #23

Deberardinis, page 28: Boulding's model of war and peace "rarely matches the real world." He uses few real world examples and at critical points is vague in his statements.

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Discourse-Unit #24

Deberardinis, page 29: Boulding's seven policy suggestions for achieving a stable world peace may not always be workable. For example, removing national boundary questions from issues of political pressure and military force is impractical.

Discourse-Unit #25

Deberardinis, page 29: Osgood's GRIT proposal advocated by Boulding "is largely untested."

Discourse-Unit #26

Deberardinis, page 30: Boulding "overestimates the impact" that having and emphasizing a real national peace policy would have.

Discourse-Unit #27

Deberardinis, page 30: Turning military forces into peace-keeping forces "assumes more unity at the United Nations than has existed since the Korean War."

Discourse-Unit #28

Deberardinis, page 31: Boulding advocates a U.N. Spying Organization. "Neither superpower would allow the U.N. to go into the spying business."

Discourse-Unit #29

Deberardinis, page 31: Boulding advocates having a policy which recognizes the positive importance (for

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world peace) of Non-Governmental Organizations (NGOs): NGOs "are effective precisely because they are separate from the strings of government money."

Discourse-Unit #30

Deberardinis, pages 31-32: Boulding confuses the reader "regarding the size of the unit he's talking about at any one time." And at times Boulding seems to think that "nation-states think and behave as individuals do."

Discourse-Unit #31

Deberardinis, page 33: "Stable Peace's unsubstantiated focus [research] dooms the enterprise from the start."

Discourse-Unit #32

Deberardinis, pages 33-35: Boulding's world model of war and peace is imperfect. It "is less than scientifically rigorous." The "efficacy of strength variables" is exaggerated. "The model fails in its nonspecificity in describing the strain, or war side of the equation." It glosses over strain factors, making the model less powerful. The model fails to deal with the important special case of nuclear weapons. Boulding also glosses over terrorism; the model's strength variables seem inadequate to countermand terrorism entirely. In Boulding's strain-strength model, strain

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needs more explanation, as it is more complex than strength. "Politics and ideology are trivialized in the Boulding model; all disputes cannot be described by the same strength-strain scheme, much less settled by the same methods." The model tends to assume conflict to be a two-nation affair. Boulding's model is interesting speculation rather than scientifically accurate. Boulding's model is one way, but only one way, to do peace research. Boulding uses his two categories (strain and strength), but this is only one possible perspective. Only two categories seem sparse. "Only with much more detailed explanation (including 'realpolitik' examples) of 'strain' relationships, could Boulding's model stand with these other methods. Again, to be fair, the aim of the book is philosophy, not formal systematic research."

Deberardinis, page 48: "The model does not provide a reliable predictive tool of international conflict; it does provide a sensible way of describing present and past conflict relationships."

Hazel Henderson as Critic

Discourse-Unit #33

According to Henderson, page 164: "I . . . wonder whether classifying horses and automobiles together as two aspects of production (the former biogenetic, and the

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latter noogenetic), constitutes too great a loss of detail."

Discourse-Unit #34

Henderson, page 165: Boulding's threat-exchange-integration model "bestows unwarranted favor on the exchange mode."

Discourse-Unit #35

Henderson, page 166: "A similar economist's bias . . . is evident in Boulding's downgrading of the family as a basic organizer of human society. Instead he favors as an example of the first 'real' organization, the hunting-gathering band 'because there is a clear division of labor and specification of roles.'"

Discourse-Unit #36

Henderson, page 166: Boulding fails to recognize the "more subtle dimensions of . . . an almost insane, sex-based division of labor, where men have become excessively divorced from experiencing the entropic realities of production. Consequently they can spin wildly abstract theories, hierarchical models of organization and rely excessively on power, control and manipulation (all profoundly destabilizing and unsustainable), while women and other lesser-caste groups and manual workers experience the entropic realities, but cannot communicate their knowledge to the predominantly

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male executives and leaders, not to mention their intellectual courtiers and apologists."

Discourse-Unit #37

Henderson, page 166: "Boulding recognizes, at least in lip service, these dangerous social imbalances stemming from such pathological aspects of specialization and division of labor. But he does not deal with all the attendant social costs."

Discourse-Unit #38

Henderson, page 167: "Boulding similarly glosses over the issue of oppression."

Discourse-Unit #39

Henderson, page 167: "Lastly, Boulding . . . still relies on hierarchical concepts, even when discussing cybernetic systems."

Eugenia C. Hunter as Critic

Discourse-Unit #40

According to Hunter, pages 8-9: Boulding's model of conflict assumes that a behavior unit acts rationally and for the purpose of maximizing its behavior. Such rationality and maximization are simplistic, elementary notions.

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Discourse-Unit #41

Hunter, page 77: "However, a severe limitation of Boulding's model is that it does not have provisions which are able to cope with a third party involved in the [conflict] situation."

Discourse-Unit #42

Hunter, page 77: Perhaps Boulding's model of conflict goes "to great lengths to explain very simple phenomena. . . . A number of steps and intricacies do not seem necessary for the model to be useful. Among these are the characterization of the behavior unit as being either an open or a growth system; the preoccupation with the difference between competition and conflict; and some of the elaborate details of the model. It is not always clear exactly why Boulding drew some of these distinctions and elaborations."

Cynthia Earl Kerman as Critic

Discourse-Unit #43

According to Kerman, page 24: "A Reconstruction of Economics . . . drew this comment from economist M. Bronfenbrenner: 'The volume is a succession of exercises in pure economics. There are no empirical verifications, statistical or otherwise, and likewise no predictions regarding the actual world.'"

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Kerman, page 24: "A scientist today is supposed to be more data-based than in Adam Smith's day, when science and philosophy were equivalent terms. It is the extremist of understatements to say, as Business Week did, 'Whatever he says about the need of more information, Boulding himself could hardly be called a data-gatherer.' . . . He would certainly be regarded as a more solid scientist if he had some controlled studies to his credit, if he stated his theories in terms that could be operationalized and tested or even if he were more careful about sources and prior research or less eager to jump to theories from minimal clues. But those who have worked with him, read his writing, and listened to him speak suggest that this is not his role. His mode is rather that of spinning off ideas."

Discourse-Unit #44

Kerman, page 31: "'Every professional reader will doubtless be impressed both by the wisdom of Boulding's discussion in areas outside the reader's competence and by its shortcomings within that area.'"

Kerman, page 31: "He had said once in his college days, 'I don't much care for preaching, but I would rather preach than listen to sermons.' He was to do much preaching, but later learned to make his sermons more palatable to modern ears by couching them in social-

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scientific terms, or coating his most earnest sentiments with the sugar of humor."

Discourse-Unit #45

Kerman, page 37: "Whether it is more useful to describe and analyze economic processes in terms of the stock (capital or accumulation) or of the flow (income and expenditure) apparently has not been settled. This long argument on stocks and flows, which began in his graduate school days and made his name known in early journal articles (in the shape of the period of production), seems to be very central to Boulding's thinking."

Kerman, page 38: "Boulding still feels, in spite of meager response from other economists, that to view the stock as the basic concept, and flow as additions or subtractions, is a clearer method of conceiving the process. The whole argument bears considerable resemblance, even to the lumps-or-liquid aspect, to wave and particle theories of light in physics. Perhaps it can only be settled as that controversy was, by believing both: some phenomena can be explained better with one theory, some with the other."

Discourse-Unit #46

Kerman, page 41: "A helpful clarification of current thinking about general systems was made recently

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by Anatol Rapoport, one of its founding fathers. He divides the field into 'hard' system theory, that portion which can be defined by unambiguous mathematical models, and 'soft' system theory, which perceives units of experience in the world maintaining their identities in spite of environmental changes, and draws analogies between many types of such units."

Kerman, page 42: "It is a question how rigorously such a theory [the 'hard' theory of general systems, e.g., some of Boulding's simplified models] can be applied to non-physical units such as ecological or social systems, because identifying the variables and the laws that govern them is a far more complex and less testable task than is the case with physical systems."

Kerman, page 42: "The 'soft' system theory can lead to even more interesting questions. Its definition of a system is close to the biological definition of an organism, with a structure, function, and history; it thus creates parallels between systems at many levels, reintegrates the biological and social sciences, and raises important ethical questions about 'organisms' at the societal level. Seeking the structural uniformities between physical, biological, psychological, and social systems has been one of the continuing goals of general systems from the time of its earliest public statements."

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Discourse-Unit #47

Kerman, page 45: "Niebuhr's comments center around a replacement of coercion as the major evil by the selfishness of man. Boulding, in his reply, gently begs to disagree, suggesting that the two men's differing life experiences have led them to different theological positions: viewing man as essentially sinful vs. viewing him as essentially good but warped by outside constraints."

Discourse-Unit #48

Kerman, page 52: "This book [The Meaning of the Twentieth Century], like his others, received mixed reviews. He was called antihumanistic, impeccable in analysis but too theoretical to be useful, and one of the few who perceive distinctly what kind of an age we are living in."

Discourse-Unit #49

Kerman, page 73: "Boulding's dislike of detail, impatience with red tape, and disregard for established forms made him particularly inept as a director [administrator of the Center for Research on Conflict Resolution] except to create enthusiasm, generate ideas, and lend status. The center seemed to attract people who were more free-wheeling and informal than some academic

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types, and the enterprise became a little too casual to suit critics."

Kerman, page 86: Boulding was "in Singer's words, 'the world's most indifferent, casual administrator,' but also 'a catalyst, reference figure, legitimizer' with 'fantastic courage and gutsiness.' His fiery enthusiasm created a general mood in which others were caught up. He may indeed have helped to set in motion one of those 'quiet revolutions' that change the course of history."

Discourse-Unit #50

Kerman, page 98: "in both Shaw and Wells the Utopian thread turned to Fabian Socialism for method. In Shaw, Wells, and Boulding, this hopefulness was based on a sense of the tremendous potential, the untapped resources in the human being. Edmund Wilson calls it Romanticism."

Kerman, page 99: "Here is the drama--sufficient for even an ambitious boy--the creative evolutionary process of man, moving from artificial class and national bonds to the building of natural human ones all across the world, tied in with man's kinship with other living creatures and the whole earth. And here is a role for Kenneth: the one who sees and interprets the way to remake the institutions of society in this evolutionary direction, by penetrating their laws and presenting them with clarity and brilliance so everyone can understand."

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Kerman, page 148: "The Christian hope for him is applied not to death but rather to life, to the learning process, to man's continual enlargement toward goodness. Evil is only a defect in the learning process: it is what is still unlearned, and is yet a problem to alert us so we will learn. The greatest sin, it seems to him, is pride; this interferes with our recognizing our failures and learning from them. The importance of humility for the learning process--the repeated references to the meek (that is, the adaptable) inheriting the earth simply through the operation of evolutionary forces--are continuing emphases congruent with this view of sin, but placing it in the secular causal relationship."

Discourse-Unit #51

Kerman, page 237: "The educational system he found less than inspiring, a series of classes, little tests, then forgetting all you have learned and going on to the next. To Fred Watts he wrote, 'Many more quarters of the stuff that passes for education (Haw Haw) in this place would reduce my mental capacities to nil.' . . . Kenneth, who worked for a while with some thought of a Ph.D., gave it up as too confining a program."

Kerman, page 272: "He has not imposed on his students a particular body of theory, but tried to open them to a wider range of possibilities, and to their 'inward teacher.'"

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Kerman, page 272: "An aesthetic sense and sureness of taste has served him better in some other contexts than when it leads him to laugh at someone's ideas."

Discourse-Unit #52

Kerman, page 295: "Combined with his tendency to entertain and be a star, it [distancing himself from others] keeps him from being helpful in a discussion when it is important to sense the movement and feeling of a group, and sometimes prevents him from entering into a feeling someone else is trying to share with him. The natural adoption of the leadership role, the continual sharing of his rich inner processes with those about him to the exclusion of theirs, is a source of enrichment; but it is also a source of trial when it stifles the communication and talents of others. His insight and tenderness for humanity as a whole sometimes seems to leave little room for insight and tenderness for those he is with at the moment."

Kerman, page 295: "Robert White has thus described the use of humor, which is part of this distancing talent, as defense and adaptation: 'A person with a gift for humor can use it as a technique for preventing serious contact with others. . . . Yet on the whole it is highly adaptive . . . [sometimes] directing the deadly shaft of ridicule against vicious self-seeking and ill will.'"

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Discourse-Unit #53

Kerman, page 300: "'And I shall find/In the vast, ripe, confusion of my mind/Bright threads of clarity, drawn on the string/Not of the true, but of the interesting.'"

Discourse-Unit #54

Kerman, page 308: "The re-exposure to Marxism through Japanese students reactivated his own early appreciation of its idealistic and heroic qualities; and the tension between this and his mature analysis of history in terms of the evolutionary process produced a creative interaction. He tends to think of Marxism now rather as a fourth great Judaic religion than as a valid system of social analysis. It is, he feels, the kind of twisted image which as a guide for economic decision-making can lead a whole society down the path to ruin."

Discourse-Unit #55

Kerman, page 314: If a good teacher gets 3 points, and a superior teacher 5 points (the maximum possible), then on the whole students give Boulding a 4 (a very good rating). Some students however claim him an incompetent

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teacher. "It is very much like the difference between Boulding's and Robert Shone's reactions to Frank Knight's teaching in Chicago days. Shone found it worthless; Boulding found it delightful, particularly when Knight went off the subject, as he usually did."

Kerman, page 314: "William B. Palmer . . . describes Boulding's courses as 'about as unstructured and chaotic as one could imagine,' as he started off with something predictable, then suddenly had an inspiration and followed it off on a tangent for several days.",

Discourse-Unit #56

Kerman, page 316: "His function as a team member on a teaching staff, except as a stimulator of ideas, was almost nil. He 'bought his free-thinking and wide-ranging impact somewhat at the price of friendship,' as one colleague put it. Perhaps it was not so much a matter of friendship as of solid dependability: if he took a job, such as chairman of a committee, he might be diverted to something else and go off on another track. His mind would constantly take him on flights of fancy, whether in faculty meeting, classroom, or lecture platform; and anyone who appreciated only careful, methodical, well-worked out points of view found this very disturbing. He is not a team thinker, he is a lone thinker: he can think alone in a crowd, but

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collaboration, bringing out a joint product, is almost impossible for him."

Kerman, page 329: "Boulding has always had a greater confidence in his sense of direction than the facts warranted."

Ezra Mishan as Critic

Discourse-Unit #57

According to Mishan, page 168: If Ecodynamics "carries the subtitle 'A New Theory of Societal Evolution', it is not unreasonable to suppose that an attempt, no matter how inadequate, at such a new theory will be found somewhere in the book. . . . Frankly, I have failed to discover it."

Mishan, page 168: "It is not that Boulding has no light to cast on social issues. He has. But it is not new light."

Mishan, page 169: "Despite the imposing chapter titles, the book lacks architectonic quality. No thesis unfolds as we plod on hopefully." "there is no encompassing or coherent interpretation of society to be found in these pages." "he is unable to produce a theory of society on the grand scale."

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Glendon Schubert as Critic

Discourse-Unit #58

According to Schubert, page 170: "Egodynamics would have been a more accurate title for this book; and turning to its subtitle, it proffers a 'new theory' of societal evolution only if one perceives general systems theory to be novel. . . . Given such godlike ambition, it is hardly surprising that this is a very unempirical book; virtually the only 'facts' in it are the remembrances that came to the author's mind as illustrations of his theoretical points. So the book is long on speculation and the author's opinions--on any subject in the universe regarding which he chooses to speak. . . . so egoistic."

Discourse-Unit #59

Schubert, page 171: "In discussing its evolution, Boulding refers to the human brain as 'an extraordinarily redundant organ' (p. 212) [sic; p. 112?], and thinks it puzzling that humans of 50,000 years ago had brains 'as large and competent as ours' of which they took slight

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advantage in comparison to our own more exemplary optimization of its potential. Whatever the empirical merits of the latter proposition--and it surely is one about which observers of the typically semiliterate products of contemporary American public school systems might entertain understandable reservations--even a cursory acquaintanceship with physical anthropology impels amazement at what follows in the same paragraph. Boulding argues that the same mutations that produced the human brain (beginning about 2×10^6 B.P.) also produced such other things 'that had short-run survival value' as 'manual dexterity or swifter running powers'. This must be another of those subjects about which Boulding really doesn't know much, because a much more precise model was readily available to him; Washburne (1978) was published later but is a concise summary; and cf. Isaac & Leakey (1979). The conventional view is that upright posture, the use of tools (and therefore dexterity), and swift and sustained running ability had evolved during the several million years before 2×10^6 B.P., as hominid characteristics of such species as the Australo-ithecines; what were probably evolving during the most recent two million years, transactively with further growth in size and complexity of the human brain, were speech and the development of social relationships in hunting bands larger than a single nuclear family. It is

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indeed remarkable that Boulding mentions neither human language nor human social organization, in or near the context of the subject paragraph about the evolution of the human brain."

Discourse-Unit #60

Schubert, pages 171-172: "His proclivity for repetition raises a question not of substance but rather of style, and we shall consider that below; but he does state that 'Nothing fails like success, because we do not learn anything from it' (p. 42), and then he iterates that 'Disappointment forces a learning process of some kind upon us; success does not' (p. 133). This is a puritanical concept of animal (including human) learning that turns its back upon--and so far as the context in the book reveals, is ignorant of--at least two generations of research in experimental psychology, to say nothing of a not inconsiderable amount of more recent work in both ethology and comparative psychology. Nothing except Boulding's personal philosophy of life is offered in support of the stark, psychologically reactionary suggestion that animals learn only from their mistakes, a perspective that is enshrouded in recollections of the folk-sayings of yesteryear about how a master beats a slave, horse, wife, dog, or child to train it to do what is right by beating it when it does wrong. Strongly to the contrary is modern learning

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theory, as represented in a remark by Neal Miller: 'learning is a relatively permanent increase in response strength that is based on previous reinforcement and that can be made specific to one out of two or more arbitrarily selected stimulus situations' (Miller, 1967, pp. 643-652). Most well adapted animals avoid aversive stimuli when they can; they tend to repeat behaviors in which they are positively reinforced (cf. Watts, 1975). In diametric opposition to what Boulding claims, animals learn at least as much (and usually much more) from success than they do from failure. Obviously, Boulding must be taken seriously when he says that 'Whether approachers and avoiders [of stimuli] represent two different psychological types, how they are produced through learning experiences, and even whether they have any genetic bases, I do not know' (p. 258). He clearly doesn't."

Discourse-Unit #61

Schubert, page 172: "In a context of references to mythology and animism (e.g. rain dances and the spirits of trees and rocks), Boulding remarks that 'Neither is it surprising that we attribute to animals emotions similar to our own' (p. 134). His implication clearly is that only children, simpletons and other naifs can take seriously the hypothesis that indubitably many other primates, probably most other mammals, and possibly a

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much broader range of animals, do experience emotions similar to those that humans feel. But his is a completely untenable position today, not only from the points of view of zoology and psychology, but also and particularly from that of the more recently convergent field of the brain sciences. At least since Darwin (1872; cf. Mortenson, 1975, Chapter 1), the question of research interest has not been whether other animals than humans experience emotion, but rather it has been to study the homologies that form the morphological substrates for continuities in affective states shared across many species, and how these affect behaviors. Certainly Harlow's work on monkey neuroses (Harlow, 1974; see Hamburg, 1968; Hamburg, Hamburg & Barchas, 1974), the observations of field primatologists (Teleki, 1973), MacLean's work on the tripartite brain and the physiology of the limbic system (MacLean, 1970, pp. 336-349), and that of the Laceys on arousal (Lacey et al., 1963), to say nothing of standard textbook discussions (Marler & Hamilton, 1966, pp. 669-670; Mortenson, 1975, pp. 71-77) and the pioneering studies of Marais (1939, 1969) and Tomkins (1962, 1963), or the more recent proposals of Griffin for a field of cognitive ethology (Griffin, 1976, 1979; Schubert, 1979), are sufficient evidence: to suggest that animals have no feelings is the most blatant sort of anthropochauvinism."

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Discourse-Unit #62

Schubert, pages 172-173: "Regarding bird song, Boulding asserts (p. 123) that 'A bird's genes produce a brain in the bird, which has a potential for learning the bird's song, but if it does not hear other birds, this potential will not be realized and the brain will remain unstructured. Here we do have something like a Lamarckian genetic process'. This is all that he explains about bird vocalizations, anywhere in the book. Regarding the first of the two quoted sentences, the leading text in animal behavior states that 'the available evidence suggests that, with a few possible exceptions . . . , the species-characteristic repertoire [of non-passerine birds] is developed independently of example . . . . Among passerine birds the call notes, which are normally relatively simple sound patterns, also usually develop independently of example . . . . In a few cases, however, certain call notes either fail to develop, or develop abnormally, in birds reared in isolation. . . . Whether or not the crucial factor in these cases is absence of example is so far unproven' (Hinde, 1970, p. 451). And Boulding is equally wrong in the second sentence, quoted from him above: to the extent that a minority of birds require learning, either to hear the correct sound patterns or to be in a normal ecological setting when they begin to vocalize, or due to

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some interactive combination of both reasons, whatever they learn is neither transmitted genetically, nor capable of genetic transmission, to their own progency. Bird song is in no sense 'a Lamarckian genetic process'."

Discourse-Unit #63

Schubert, page 173: "Since this book purports to be so strongly biological in its concern and perspective, it seems fair to point out that, in connection with his explanation of Figure 4A.4, Boulding remarks that 'I use lions and tigers, feeding on the same food supply, as an illustration'; and the ensuing discussion (p. 92), of mutually competitive but stable equilibrium makes it evident that his felids are not in a zoo, in which case he should have specified the geologic era in which empirical data might be found (at least, in principle) to test his model. Certainly there is no precedent for feral lions and tigers to co-exist in a common habitat, during historic time."

Discourse-Unit #64

Schubert, page 173: "Ten pages later, there occurs a misleading and inaccurate attempt by Boulding to analogize meiosis to the shuffling and dealing of playing cards. He is discussing--and given the context, God only knows why--the extreme and hypothetical case of a pair of genetically unrelated siblings, of whom 'each got a

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different half of the chromosomes from each parent . . . [which] has about the same probability as that of dealing two completely different decks of cards by combining two halves of two well reshuffled packs'. Preposterous. Not only does each gamete represent, at each allele, a selection from among the relevant genes of the parent animal; it is also the case that, during meiosis, a (for present purposes, random) selection is made between the chromosome from the sperm and the matching chromosome from the egg. Half of a well shuffled deck will contain 26 randomly selected cards, but two such halves (from different decks) cannot be simply reshuffled together to constitute any reasonable analogy to meiosis. The meiosis model requires that each half-deck contain an identical array of cards; the two decks are then turned, in proper and the same sequence, face down on the table; and by some random process it is then decided to select, each of 26 times, a card from either one deck or the other, the resulting set of 26 cards then constituting the analogue of the nucleus of the fertilized egg. But this is a very different use of the cards than what Boulding describes."

Discourse-Unit #65

Schubert, page 173: "Boulding describes the economic value added to a product by the co-ordinative and directive function of an organization in the

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operation of an enterprise, after which he remarks that 'There is no simple parallel for this phenomenon in the biological world' (p. 179). Oh yes there is: it is called 'synergism', is commonly employed in medicine and physiology, and is defined in a standard undergraduate biology text on ecology as the 'total effect of the interaction exceed[ing] the sum of the effects of each substance' (Odum, 1971, p. 92); and in social terms as 'effects that cannot be achieved by the individuals operating independently' as applied to human evolutionary theory by Corning (1980)."

Discourse-Unit #66

Schubert, pages 173-174: "'A species', says Boulding, 'is a set of items that conform, to a common definition'. And later, he says: 'Each commodity is a species' (p. 170). Evidently he suggests such definitions so that he can take stock, in the shopkeeper's sense; but this surely is not the biological definition of a species. Successful reproduction by the offspring of a pair of putative members of a sexually reproducing species is a conventional biological criterion; and if Boulding's retort is that he was speaking only metaphorically here, then one must challenge the indiscriminate use of biological concepts to refer 'metaphorically' to such inanimate objects as

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clouds and stars, and especially in the context of taking stock of a population of human babies (p. 54)."

Discourse-Unit #67

Schubert, page 174: "Earlier he indicates a more correct understanding of sociobiology (pp. 20-21), but subsequently Boulding refers to 'What might be called the "original sin" school of sociobiologists--Lorenz, Ardrey, Tiger and Fox' (p. 154). An initial problem is posed here by the circumstance that none of the named individuals is a sociobiologist: Lorenz is one of the founders of classical ethology; Ardrey is an exponent of pop ethology; and Tiger and Fox are anthropologists whose interest primarily is in biosocial anthropology. Boulding's apparent mistake here is to have swallowed hook-line-and-sinker the bait of academic empire-builders Edward Wilson and David Barash (Schubert, 1981)--who are the only 'sociobiologists' whom Boulding cites--and therefore to confuse social biology, the study of the ethology and ecology of social (group dwelling) animals, with sociobiology, which in virtually all contemporary critical discussion (Barlow & Silverberg, 1980; Caplan, 1978; Gregory & Silvers, 1978; Midgely, 1978; Ruse, 1979; Wallace, 1979; Wheeler, 1978; Wilson, 1978) is understood to be a theory of genetic determinism of animal behavior in regard to sexual and kin selection, and altruism. The model is one of competition among individuals who have

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been selected to behave so as to maximize their respective inclusive fitness, in contributions to population or species gene pools; and it has been well stigmatized by Sahlins as a form of 'genetic capitalism' (Sahlins, 1976, p. 72)."

Discourse-Unit #68

Schubert, page 174: "Under the subhead of 'Conflict in the Biosphere', Boulding discusses conflict in prehuman biological systems (whatever that means), identifying (characteristically) three elements: territoriality, pecking orders, and sexual selection. For present purposes I shall focus upon only the first of these three, having selected it for discussion because of his claim that 'Group territoriality . . . is the worst of all possible strategies' (p. 225) [sic; p. 255?]. He argues that this is true because of two reasons, neither of which is at all clear in the form of his statement of them. One is because it (presumably, group territoriality, on grammatical grounds) involves fighting. But with whom: intragroup (which makes little sense), or intergroup; and if the latter, why and when? Evidently, there is little such fighting between groups of howler monkeys, for example. The second indicated reason is that 'it also means that the population of the species will be limited by the food supply rather than by the territory'. But the food supply normally is on the

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territory, which is defended in order to protect the food supply. The distinction suggested by Boulding, between the food supply and the territory, is one without a difference--at least, according to ethologists and ecologists, subject to the caveat (with which Boulding is not concerned) that some territories, such as leks, are established for other purposes than foraging, such as mating (Davies, 1978, pp. 317-350). Boulding does indulge in the unusual (for this book) act of citation, at the end of the paragraph in which the above discussion occurs; but this turns out to be for the purpose of discrediting Robert Ardrey for his having completely missed the point that group-territorial 'species are in the worst of all possible worlds'. I dare say that Ardrey will not be alone in that posture, given in the incoherence of Boulding's statement in defence of 'the point'; but turning to its merits, I can't even think of any support of his view, in the contemporary literature of ethology. And there certainly is a large body of research that contradicts him, in regard to, for example, wolves (Hall & Sharp, 1978), other primates (Wilson, 1975, pp. 529-530), social insects (Wilson, 1971) and lions (Schaller, 1972)."

Discourse-Unit #69

Schubert, pages 174-175: "Most puzzling of all is Boulding's failure to relate his argument about group

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territoriality to humans, who not only are but by all accounts must have been a group-territorial species for at least the past two million years (counting relevant precursor species, as well as Homo sapiens sapiens) (Durham, 1976; cf. Schaller & Lawther, 1969; Thompson, 1978). It does seem extraordinarily peculiar to purport to discuss conflict in the biosphere, but to leave out of account the 'prehuman biological systems' of our group-territorial hominid ancestors. The only apparent justification for this is that, on the following page where he takes up 'Conflictual and Nonconflictual Processes in Human History', he wants to avoid having laid a groundwork that would embarrass his emphasis there upon the 'nonconflictual' processes of 'unviolence' that are said to characterize humans. If this be peace research, it is no wonder that we continue to have such poor understanding of how to avoid war."

Discourse-Unit #70

Schubert, page 175: "'It may well be', says Boulding, 'that biological evolution is approaching its end and that it will be succeeded by an evolutionary process wholly dominated by noogenetic [human artifactual] processes directed by human values' (p. 22). Indeed, 'There is a reasonable hope in all this for at least a long-run "time's arrow" toward betterment' (p. 23); and then in repetition, the proposition is

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strengthened as he infers from an analysis of the 'prisoner's dilemma' game that 'the long-term payoffs are for being good, that is, benevolent, trusting, and so on. There is a very long-run evolutionary process in this direction . . . ' (p. 204). Again, Boulding has taken a position contrary to that of leading experts on evolutionary theory, this time those in the field of population genetics. Both Ilan Eshel and William D. Hamilton have supported the hypothesis that recent cultural selection has failed to halt the decline in cultural altruism that began with the rise of civilization some 10,000-12,000 years ago. The logic of their argument is that altruism was a condition prerequisite to successful group adaptation, for hunting-band and pastoral demes; but with the shift to agriculture and urbanism, individual and family selfishness have progressively displaced the common good in the value systems of human cultures. This process has been accelerated, of course, incident to the industrial revolution of the past two centuries; and it finds its ideal rationalization in laissez-faire capitalism, as a theory of human nature as well as one of political economy. Eshel states that the theoretical conclusion of his study suggests 'that some intrinsic human drives, altruistic in nature, that are fundamental for the establishment of any human civilization, could possibly

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evolve only under precivilization demographic conditions. And it is possible that just those selection forces imposed by civilization itself act to reduce the frequency of these fundamental drives within human populations, thus leading it into the course of misadaptation' (Eshel, 1972, p. 275, emphasis added). Eshel is cited with favor by Hamilton, who--not Edward Wilson--is the founder of modern hardcore sociobiology, and whose own conclusion is that 'civilization probably slowly reduces its altruism of all kinds, including the kinds needed for cultural creativity' (Hamilton, 1975, p. 150)."

Discourse-Unit #71

Schubert, pages 175-176: "Boulding does concede that, 'if Henry Ford had died in infancy, surely there would have been another person to invent the assembly line, because there were at least 200 firms already making automobiles' (p. 204). This is no trivial concession for Boulding to make, either, in the light of his evident obsession with automobiles (with which I shall deal further, below). But it makes all the stranger his historicist suggestion that 'If Herod had succeeded in killing Jesus as a baby, the history of the next two thousand years might have been very different' (p. 37). Surely there is no basis in either biological or social science for such a conclusion; there were many

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more than 200 itinerant rabbis, 2000 years ago in Palestine, who acted in the role of 'a stereotypical miracle worker, a stock figure of Hellenic culture' (Newsweek, 24 December 1979, p. 50) and many of whom succeeded in arousing the antagonism of the established Hebrew clergy and consequently their own execution as common criminals. Then as now (cf. Rokeach, 1964), there must have been at least as many potential Jesuses as Henry Fords; and from the point of view of post hoc memories and the development of a legitimate genesis for an ongoing movement of radical social protest near the end of the first century A.D., and Alter Ego would have been found to Deify, if the historic Jesus of Nazareth had been one of the vast majority of humans of his day who died in infancy--irrespective of cultural accentuation by the Romans of what was then a natural process and probability. If 'it is the business of organized human knowledge to detect' and to 'search for' the patterns 'amid the randomness' (p. 37), then it is the business of reviewers of such patterns to denote when the pattern is constructed on the basis of theosophical choice."

Discourse-Unit #72

Schubert, page 176: "No evidence whatsoever is mentioned in support of Boulding's assertion that, in regard to warfare, today as in the past, 'the difference

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between monolingual and multilingual societies is not really very great' (p. 132). Boulding is a past president of both the Peace Research Society and the International Studies Association, so he is presumably on home turf when he speaks on the subject of warfare (whereas I am not); but all of the evidence with which I am familiar indicates how wrong he is in the remark quoted above. Certainly, the protagonists of the worlds wars of this century have been conspicuously monolingual societies (Germany, Japan and Italy). Typically, multilingual societies (Canada, Belgium, Switzerland, South Africa) are so preoccupied with maintaining 'peace' between (or among) their internally competing ethnolinguistic minorities that it is too difficult, ceteris paribus, for them to create and maintain the kind and degree of national consensus prerequisite to the successful launching of agressive international war (cf. Lijphart, 1979). And certainly, apart from the question of warlike propensities, it is patently false, in the judgment of political scientists and political sociologists, that 'the difference between monolingual and multilingual societies is not really very great' (see Porter, 1965; also Lijphart, 1975). He also states that 'One certainly cannot credit Protestantism with the energetic development of northern Italy or Japan!' (p. 216); but only a person unfamiliar with such work as that

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of James Dator, who has written on '"The Protestant Ethic" in Japan' (Dator, 1966), could be so self-assured as to terminate such a claim with an exclamation point. Such off-the-cuff, unsupported, global remarks have no prima facie plausibility; and they require more for acceptance than the prestige of their source, even in the universal context of this book."

Discourse-Unit #73

Schubert, pages 176-177: "A major problem for this book, which purports to proffer a new theory of societal evolution, is the simple-minded dichotomy that Boulding appears to entertain, and on ideological grounds, between economics (which is good) and politics (which is bad). 'Political organization', he says, ' . . . is based on the modification of the behavior of others by threat (p. 154). 'Bandits' (who appear in this book almost as frequently as automobiles) also take other peoples' property away by threat; but unlike the government, bandits do it illegitimately (p. 142). However, 'An exchange-oriented organization or a "business" . . . is a sharp contrast with political organizations, organized through the threat system, which derive input of food materials and so on from producers and to whom they give nothing in return but threats of loss and damage, and which use these input solely for the purposes of the organization itself, such as fine palaces and temples'

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(p. 169). And (same page) 'what the king gets the farmer loses'. (Where Boulding is able to locate either of these social actors today, in any of the temperate-zone political economies, provides a challenge to the reader's imagination.) Eventually he reaches 'The general conclusion . . . that activity in organizing conflict--forming political parties, agitating, fighting wars, and making revolutions-- . . . has very little long-run effect. It is the processes of growth and production rather than of conflict that are really significant' (pp. 265-266). Indeed, 'It is only as we develop nondialectical philosophies stressing productivity rather than conflict, integrative systems rather than threat, economics rather than politics, that the dialectical processes . . . will become fruitful rather than pathological' (pp. 266-267; emphasis added). The pathology lies in this sort of Dick-and-Jane level approach to the understanding of human behavior."

Discourse-Unit #74

Schubert, page 177: "There is one possible clue as to why Boulding's treatment of politics is so, er, elementary. We find, in the context of some remarks about animism and superstition, the suggestion that 'If we turn to the political pages, we will find embodied spirits like . . . John Bull' (p. 345). If this is what Boulding expects to find in a political cartoon in an

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American newspaper, then we can better understand how he can entertain the peculiar views that he does about politics. Evidently, he hasn't bothered to look at any editorial pages in recent decades, because it has been a long time since the ones I have been reading have featured either John Bull or any other nineteenth century political symbols."

Discourse-Unit #75

Schubert, page 177: "Putting economics to one side, Boulding is no clearer in his thinking about questions of political organization per se. On the one hand, when it suits his purpose to use the example to support a point about catastrophe theory, he warns that 'If . . . we develop a single world civilization and anything goes wrong, everything may go wrong' (p. 82). But then again, on the other hand, he argues that the only alternative to nuclear holocaust during the next century must be 'the beginnings of a viable world political organization capable of policing disarmament [which] will be just around the corner' (p. 154). One world is bad because you shouldn't put all of your eggs in one basket; one world is essential because we cannot survive without global political unity. As I said above, the problem with Boulding's political thinking is that it is simplistic. And it is by no means clear how he would expect to achieve either horn of his dilemma, although

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some of the accompanying undertones are not reassuring. On the page preceding the last quotation, for example, he refers to the termination of World War II in Europe, with the arrival of both the Western and the Russian armies in Berlin; and then he makes the rather curious remark that as a consequence of that juncture, 'Hitler's Germany at least was extinguished' (p. 153). At least? What more would have been appropriate, or desirable?"

Discourse-Unit #76

Schubert, page 177: "As for lesser levels of political organization, I did not notice his taking a position on the continuing viability of state governments in the United States, and there is no indication that he has any familiarity with townships; but he has made his position on counties perfectly clear: 'They are absurd anomalies in the world of the automobile' (p. 221). The logic of his argument, in context, is that instead of having seats of government that a man can walk to, in a single day, they should now be spaced so that a man can drive there in a single day in his automobile. The best that one can say for his remark is that it comes at least two-thirds of a century too late; evidently it has not occurred to him that his beloved automobile is in about the same position that the horse-and-buggy was then."

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Discourse-Unit #77

Schubert, pages 177-178: "I have no quarrel with Boulding's manifest perception of Marxism as a variant but particularly repressive form of capitalism, as exemplified most vividly in the Soviet Union today; but one is puzzled by other of his incidental remarks on the subject. 'Oddly enough', he says, 'the Marxian vision is a good deal more applicable to the relative simplicities of pre-capitalistic society than it is to the enormous complexity of developed capitalism' (pp. 21-22). But why 'oddly'? The time of Marx' life and work was centered, like that of Darwin and Dickens, in the middle of the nineteenth century, relatively early on in the development of both industrialism and capitalism--certainly, at least, well before the 'enormous complexity of developed capitalism' as in the last quarter of the twentieth century. What would really have been odd would have been if Marx had been able to write with accuracy and in detail about economic and political institutions that had not yet evolved for him to observe (cf. Bellamy, 1889). Thus, Boulding notes in due course that 'The proportion of national income going to labor went up in capitalist societies, not down as Marx predicted, and surplus value was widely distributed to the working class without any revolutionary change' (p. 354). Except, he might have added, in consumer-exploitive, Marxist

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countries. Surely, as astute an observer as Karl Marx would not want to be Marxist today."

Discourse-Unit #78

Schubert, page 178: "Boulding's understanding of the effect of wars upon prices is characteristically idiosyncratic. In the United States 'The deflations following 1815, 1865 and 1929 were periods of relative stagnation and slow growth, as deflation redistributed income and wealth away from the energetic and active profit-maker' (p. 227): and there is not a word in the preceding or consequent discussion to explain why deflation occurred at these particular times. (His preceding paragraph attributes sixteenth century inflation in Europe to the expansion of the supply of gold that was imported from the Americas.) Some will favor the hypothesis of an Unseen Hand, administering in this instance an occasional slap on the wrist to some of its favorites; but the more usual interpretation is based upon notice of the coincidence that each of these deflations was preceded by a major war--and the conventional hypothesis is that the waste of goods in the prosecution of the war produced inflation, which in each case eventuated in a readjustment of prices, labor, goods, and production by means of a period of deflation. No doubt this is a simplistic statement of the economics of war and the price system; but it seems at least as

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satisfying as Boulding's discussion of the three specified deflations, which makes them appear to have been the products of some kind of virginal economic birth."

Discourse-Unit #79

Schubert, page 178: "This book is bedeviled by several, evidently idiosyncratic, hang-ups of the author. Although 'bandits' provide, perhaps, the more intriguing case, surely the most conspicuous is his (previously remarked) fetish for automobiles, which are mentioned so frequently that I gave up trying to keep track. He introduces them much earlier; but by p. 53 he feels impelled to point out that 'it is very easy to invest an automobile with personality, even to the point of giving it a pet name'. This is followed by a discussion of the 'multisexual' parentage of social artifacts, to which he feels compelled to add in the next sentence the disclaimer that 'Existing automobiles play a minor role in the production of automobiles' (p. 68). On the very next page we encounter a reference to "the niche" of the automobile'; and then, back to the sexual imagery, we are informed that 'an automobile emerges off the assembly line from the womb of the factory' (p. 124); and then again, on the next page, that 'out of this multisexual orgy the automobile emerges'. There is more about their reproduction on p. 173; and then on the next page, KEM is

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trotted out again to transform 'into the appropriate forms, whether this is a chicken or an automobile'. (Many less imaginative readers might expect him to have referred instead, at this point, to 'a chicken or an egg'.) And by no means least, we learn at p. 191 that the people around us 'are in a certain sense extensions of ourselves, as indeed are the automobiles we drive, the clothes we wear, and the houses we live in'. What is most interesting in the latter assertion is that for Boulding, autos come before clothes or houses, as extensors of human personality."

Discourse-Unit #80

Schubert, pages 178-179: "Another of the author's gratuitous mannerisms, which I suppose is best dealt with as a question of style, concerns his evident love of trite metaphors, many of which would be more appropriately associated with some alternative work, possibly one called "Poor Kenneth's Almanac", than they are with the present volume. What follow here are only a few selected examples of what surely are recognizable as 'Simple Sayings':

> A mouse has a lot more biological activity than a huge, inert, slow-growing redwood (p. 87).
>
> [T]he koala bear [is] a teddy-bear type . . . (p. 113).

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> Snow is really a great road builder (p. 152). . . . cattle, from which the word pecuniary comes . . . (p. 168).
>
> No person has ever been inside another skull (p. 199).
>
> It is only a slightly farfetched metaphor . . . to think of human artifacts as 'secretions' of social organizations, much as oysters secrete shells (p. 221).
>
> We must strive, stripped for action, to build up stress and cultivate strength (why do all these words begins with 'str'? . . .) (p. 266).
>
> The socialist countries indeed are dull (p. 279).
>
> [R]elatively homogeneous countries like the United States, Russia, and China can thrive . . . (p. 282).

It certainly is true that I quote him out of context here; but any reader can check the context for each Simple Saying, and my assertion is that doing so won't help. Some are truisms, others are trite knowledge for anyone likely to look inside this book, still others are vacuous, and the last one is patently false."

Discourse-Unit #81

Schubert, page 179: "Unnecessarily distracting, in my opinion, are the frequency of repetitions that appear

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to have been unnoticed by the author (to say nothing of his editor, if any). Thus, he remarks the lack of rational grounds of reexpressing vital statistics as frequencies per thousand, instead of as 'simple' decimals, on p. 59; and then half a dozen pages later he makes exactly the same point--a rather trivial way of filling up the book, at best--as though he were the first to cast such a pearl before students, not to mention his sense of doing so de novo in this book: 'There is apparently no particular reason for this custom, but the reader should be aware of it in other literature' (p. 65). At p. 79, we are introduced to the notion that dung beetles improve the pasturage of sheep, in the sense of carrying capacity, by better spreading the sheep manure; and although this may be deemed a complex idea, it hardly seems necessary to reintroduce it as a novelty hardly a dozen pages later: 'A striking example is the dung beetle and sheep. The dung beetle scatters the manure of ruminants and hence improves the yield of grass. Ruminants, of course, provide the manure for the dung beetle to live on. This is a case of some practical importance, as there were originally no dung beetles in Australia. They were introduced . . . ' et cetera, ad nauseam (p. 94). Then we have 'what Garrett Hardin has aptly called the "tragedy of the commons"' (pp. 315-316), followed by 'the "tragedy of the commons", in the famous

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phrase of Garrett Hardin' (p. 358); and each reference is dutifully cited, with identical citation in each case, of course. Similarly we find Mamdani's brilliant essay, explaining why Indian peasants feel obliged to produce (on the average) eight children, in order to get four sons, thereby contributing to the population explosion (p. 300); but if we didn't understand the anecdote the first time around, we get a fresh chance on p. 355, where we are told that 'As Mamdani has shown, the only hope of the poor Indian cultivator is to have at least four sons so that he can expand his holding and perhaps send at least one son to the city to send back some remittances'; and again the same citation is provided, in both instances. (It may seem picky of me to hammer away at the frequency of duplicate citations in the cases of repetition; but when a book is so minimally supported by citations, even to and especially other than the author's own earlier work, duplication cuts down the references to outside sources in a substantial manner.) We are even told twice that 'truth has the remarkable capacity that it cannot be found out' (p. 133, and cf. p. 237)."

Discourse-Unit #82

Schubert, pages 179-180: "The abstractness of his approach frequently is reflected in a looseness of expression that entails ambiguity in meaning, as in Boulding's remark that 'The flag probably originated in

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the medieval standards by which the followers of a particular knight were able to find him on the battlefield' (p. 197; emphasis added). A more empirical thinker would have said 'on'. The abstractness is accentuated in the appendices which adorn a majority of the chapters. Typically these feature equations or figures, as exemplified by Figure 10A.4: 'Combinations of Threat, Integrative, and Exchange Systems', concerning which the author ventures the entirely appropriate remark that 'This, it must be emphasized, is purely illustrative and is not based on any kind of quantitative research' (p. 229). The rationalist tenor of his thinking is demonstrated by his assertion--which surely represents an extraordinarily deterministic hypothesis about language change--that 'Every word of my vocabulary could strictly be traced back to the person who first started it as a mutation' (p. 199; emphasis added)."

Discourse-Unit #83

Schubert, page 180: "Many authors, of course, find it burdensome to copyread what they have written; and any copy editor worth his salt would have excised or modified all of the repetitions noted above, for example, long before the manuscript got into galley--a generation ago. What the above really illustrates is that we are in a very different kind of ball game today: publishers aren't going to pay their employees to go through and

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clean up a manuscript any more, so if the author won't do it (or won't hire anyone else to do it for him), then it isn't going to get done. And there is other evidence, beyond the usual typographical misspellings as exemplified by the misspelling of the author's own name (p. 231), that indicates that this was a carelessly edited and published book. I'm not going to rehearse it all here; just enough to suggest the dimensions or the problem. Thus, at p. 110 the author says that 'we shall see' more of what he is attributing to Social Darwinism, when we come to p. 23; the logical problem is that we already have previously come to, and presumably seen, that discussion on the earlier page. Similarly, there is a remark on p. 227 about profitmaking bourgeoisie who, 'as we have seen (p. 181)', gain in inflation. In fact p. 181 discusses unemployment; and it contains no reference to either the bourgeoisie or inflation. More serious is the blank spot on p. 296, where one complete line is missing; and the pair of iterated lines on p. 299, for the obvious reason that the repetition of the same two lines that properly begin the second paragraph on that page, as the first two lines also of the third paragraph, necessarily results in the deletion of whatever two lines were supposed to have appeared there. Ramrodding 'camera ready' copy through production doesn't

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appear to be all that it is cracked up to be, at least from the perspective of attentive readers."

Discourse-Unit #84

Schubert, page 180: "One of the early anecdotes of the book is about the Oxford don who, during Boulding's pre-American socialization, was accustomed to crawl under the table and then tutor him in a plaintive, British-pitched voice: 'It is all very well to talk about evolution, Mr. Boulding, but what evolves, what evolves, what evolves?' (p. 33). It is clear throughout this book that that tutor knew his man. Barely half a dozen pages from the end of the book, we encounter another tortuously mixed metaphor, this time about 'The persistence of Judaism as a genetic strain producing cultural offspring' such as Christianity (p. 352). Evidently this is meant to be taken literally as well as seriously; and in the very same paragraph, the same main clause for three of four successive sentences is 'It survived', evoking the haunting image of that high-pitched, querulous, Oxonian voice, called to Kenneth from beneath the nearest table and demanding to know: 'It is all very well to talk about the survival of Christianity, Mr. Boulding, but what survived, what survived, what survived?'"

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Albert Somit as Critic

Discourse-Unit #85

According to Somit, page 183: "The difficulty, of course, is that while we can use the language of physical and biological 'laws' in dealing with social phenomena, the net result in most cases is to achieve an essentially metaphoric mode of description rather than a more powerful type of explanation. In this respect, I fear, I don't think that Professor Boulding has been notably more successful than were his distinguished predecessors."

Discourse-Unit #86

Somit, page 183: "I am hard pressed to see that the evolutionary vision has enabled him to add much to what has already been said by others."

Somit, page 184: "I am not suggesting that Professor Boulding's predictions or judgments are incorrect. I would argue, though, that the evolutionary synthesis was not absolutely indispensable for their attainment."

Discourse-Unit #87

Somit, page 184: "The discussion sometimes seems to have little coherence and there are intrusions of dubious relevance." "Professor Boulding has not succeeded in his evolutionary synthesis." "I doubt that the physical sciences can tell us much about human

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behavior." "I share Professor Boulding's faith that the synthesis he sought offers the most promising hope for a better understanding of what we are and why we behave as we do. Where we part company is with his assumption that biology or, to put it somewhat different, evolutionary theory, is already equal to the task."

Judith Peterson Stevens as Critic

Discourse-Unit #88

According to Stevens, page 27: "The changes in all systems, and the determiners of their interaction, are brought about by the 'subjective content of knowledge' or the image system within individual human minds [according to Boulding]. . . . [Boulding] is aware of a world which exists beyond the limitations of his immediate sense perception."

Stevens, page 28: "But he never quite brings it off."

Stevens, page 28: "Thus, much of Boulding's assumptions of image growth and change reflect Mead's 'self-other' concepts, in which theory a person becomes himself by reflecting his actions and attitudes against the expectations and prohibitions, overt or implied, of other people. This is a useful psychological concept, but it is helpless in epistomological [sic] clarification. Boulding is getting in very deep water

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here, since he wants very much to demonstrate a real world exists outside of personal images, but he insists all people know is an image."

Stevens, page 29: "Boulding equates knowledge with images, and often avoids use of the word knowledge because it implies truth, and truth has no necessary relation to images."

Discourse-Unit #89

Stevens, page 29: "Boulding says most definitely that 'we get along in the world because we consistently and persistently disbelieve the plain evidence of our senses. The stick in the water is not bent; the movie is not a succession of still pictures; and so on.' . . . In this he is mistaken . . . our senses plainly do tell us the stick is not bent when it comes out of the water, and the still pictures rapidly succeeding one another do move according to our visual evidence."

Discourse-Unit #90

Stevens, pages 29-30: "Boulding . . . accepts no 'philosopher's stone' by which truth may be ascertained. He specifically discounts scientific evidence, for the scientific method is only 'one among many of the methods whereby images change and develop.' . . . Although science is useful, it does not give validity."

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Stevens, page 30: "Boulding suggests a theory similar to Alfred North Whitehead's, that there is a definite relationship between the physical and chemical structure of the human nervous system and the structure of outside reality. . . . He says this theory is an 'article of faith' among physical scientists, another inaccurate generality, and he, personally, is agnostic on the matter. In fact, he doubts man will ever discover the correspondence between physical and mental structure for the act of observation will destroy what is being observed. (p. 17) Furthermore, for Boulding's theory, truth is simply not important. He disclaims it, and falls back on his own article of faith that man can communicate with other men because men are genetically constructed to be able to do so. Man, then, is a symbol-using creature, and images are all he knows. This may begin to sound like a naive version of Ernst Cassirer, so it must be pointed out that Cassirer clearly differentiates between what man knows as truth and knows in myth. . . . Man knows a good deal more than symbols or images for Cassirer, but he does not for Boulding."

Stevens, page 31: "Although we cannot test the truth of an image, we can test its goodness in terms of its own value system or some other value system we impose upon it."

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Discourse-Unit #91

Stevens, page 32: "The names of Moses . . . and Hitler exemplify a few of the men whose personal images changed social images. These special persons provide the mutations, so to speak, in the image structure of society. How and why they can exert the influence they do is a mystery as far as Boulding is concerned. (This is an avoidance technique of Boulding's. When he disclaims any knowledge at all, it should probably be interpreted to mean he doesn't care to discuss the matter. If, as previously mentioned, images change because of repeated messages or because of the powerful force or authority of the message these culture-changing individuals must exhibit either or both ways of operation. It is an easy assumption that Hitler's impact was probably due to mass media techniques of repetition; Moses, on the other hand, probably was a powerful personality with persuasive talents.)"

Discourse-Unit #92

Stevens, page 33: "When are scientific images false? Boulding does not give us criteria for answering this question."

Stevens, page 34: "How can we know our images conform to reality? We can compare images only to other images. Men are saved from solipsism partly by feedback messages derived from empirical testing and partly by the

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perception that some aspect of the image is public. . . . If, as previously cited, scientific testing is only another image and there is no such thing as truth, Boulding is not saved from solipsism at all. He may be somewhat aware of this, for he deliberately avoids the questions his theoretical assumptions raise: ' . . . The pursuit of the question . . . leads us into a philosophical morass from which, as David Hume suggested, the only escape is to climb out, clean oneself off and go home, have a good dinner and forget all about philosophy.' ('The Economics of Knowledge, and the Knowledge of Economics,' p. 1) This witticism is a device to persuade his audience not to worry about questions Boulding cannot or will not answer. If there is no truth, no assurance that Boulding's theory is more useful or valuable than another's, why should anyone allow Boulding's image system to significantly alter his own? Boulding obviously disbelieves his own implications, for he writes voluminously in an attempt to persuade and influence others. It must be pointed out that the only way he can be sure there are any others is through faith in his own image system. It is too bad he does not clearly come to grips with the epistemological problems if he is going to raise the question."

Stevens, page 52: "Social institutions must be protected from teaching and men from learning things that

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are no longer useful images. (Boulding has a difficult time here. On one hand he has taken pains to point out that there is no such thing as truth, yet there are obviously false and misleading images. Folk [folk-literary] images of national states are bad. Why? Because they interfere with successful reality testing or feedback messages. What, precisely, is that process? How can you test reality if there is no criteria for truth? Boulding cannot have it both ways; either the scientific method yields warranted assumptions or it doesn't. If it is only an image among other images, it cannot. Yet Boulding wants and believes the method to be important. He is clearly in contradiction here.)"

Discourse-Unit #93

Stevens, page 52: "The process of image formation and image change is not understood, but Boulding anticipates this is a key process for useful learning. People must learn from changing social systems in order for society to evolve successfully into a post-civilized state."

Discourse-Unit #94

Stevens, page 58: "How does Boulding hope men and societies moving into post-civilization will avoid the traps of war and pollution? The answer lies in education, defined as the process of image change.

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Although teachers and schools are important, it is society that teaches. No social institution can fail to be an educational institution in this sense, nor can anything social, for all image change results from man's interaction with his environment. (By defining education in this vague fashion, Boulding makes absolutely everything known to man educational, for man has the potential to interact with anything. This imprecision gives Boulding a useful ambiguity; his articles on education rarely deal with what is specifically germane to schooling.)"

Discourse-Unit #95

Stevens, page 63: "A most encouraging economic aspect about knowledge is that it is a commodity which does not obey the laws of conservation; the teacher increases his own knowledge as he teaches and increases the knowledge of others at the same time. . . . [Nevertheless:] It is very possible for a teacher to concentrate on particular aspects of subject matter he is presenting to his classes until he forgets or loses intellectual precision in other subject areas. And although the class may be learning more, there is no foolproof way of ascertaining more of what? Students may be learning to hate the teacher . . . There is no guarantee of exact transfer of images in teaching.

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Boulding is referring here to a highly idealized, as well as generalized situation."

Stevens, page 64: "Although Boulding continually refers to formal educational institutions as performing an essentially integrative social function, this is an idealized conception again. To judge from the comments and criticism Boulding levels at them, Boulding actually sees schools as threatening institutions, although they should be integrative. Threats occur in the form of grades, of discriminations on the basis of competency, and, most important of all, the level of formal schooling completed, for this often determines an individual's social mobility. . . . the school's greatest impact is found in the flexibility, or lack of it, in images the school's students possess."

Discourse-Unit #96

Stevens, page 64: "The learning process is also the process of social evolution for Boulding."

Stevens, page 65: "If their image system were flexible and accommodating, change would be progress, not disintegration. Observed objectively, both forms of change would probably be identical. Boulding's definition hinges on the nature of the image which enables a society or individual to maintain internal equilibrium. Another problem arises in that it is conceivable for an image system to maintain equilibrium

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and flexibility, yet change to become more cruel and threatening. Boulding has no way of denying this kind of change is progress, although he obviously would not think it was. He defines the problem away when he insists threat accompanies rigid images and goodwill goes with flexible ones. This is wishful thinking; there is no logical connection here at all."

Discourse-Unit #97

Stevens, pages 67-68: "Another pattern structure which should be taught in schools is that of equilibrium. . . . Everything in this pattern depends upon everything else. (This does not prove to be a helpful analogy, or image, as Boulding would say. Everything obviously does depend on everything else in some respect, but when you say this what have you said? If everything depends on everything else, where can you possibly draw any line for useful analysis? Are not some things more important than others? Furthermore, just because nature may harmoniously balance interacting populations in a pond is no guarantee nature, or man, can do something similar in society. The populations in ponds and societies differ; so do the interactions. Boulding knows this; his whole appeal is based on the assumption man can do things tadpoles cannot.)"

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Discourse-Unit #98

Stevens, pages 68-69: "The evolutionary pattern adds interpretive explanation to growth and development; it is very descriptive of the past, but has almost no predictive power. . . . (Evolutionary change is always good change for Boulding, for he pictures the process as growth toward an ideal. Knowledge is concerned with images; Boulding uses the terms interchangeably, although he makes clear he does not think knowledge is truth. Boulding does not know what the image is evolving toward, but he believes that it is good. There is a suggestion here of the Hegelian or Quaker process of historical dialectic working itself out within and because of the will of God.)"

Discourse-Unit #99

Stevens, page 69: "This evolutionary patterning of complexity and simplification in the image leading to more complexity and simplification, is inherently unpredictable."

Stevens, page 70: "Man's creativity in arranging or patterning old images results in new images, and creativity is unpredictable. It might be wise for Boulding to equate evolution with creativity rather than change, but he does not do this."

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Discourse-Unit #100

Stevens, page 70: "Because change in images leads to social change, it is important to create or maintain a broad, flexible image base in school children. One way to possibly achieve this is for the schools to teach many different ways of doing things, and get across the idea that no one procedure is necessarily best. (Boulding indulges an inaccuracy here. Obviously some ways of proceeding are better than others for certain ends. Efficiency demands particular actions. Even when referring to social interaction, Boulding claims integrative relationships are better than threatening ones. He seems to be championing an attitude of flexibility where it doesn't make any particular difference. The example he cites in illustration is the British nanny at a swimming pool making her charges miserable with admonitions of 'Swim properly! Swim properly!' Boulding says his children just swam cheerfully. . . .)."

Discourse-Unit #101

Stevens, page 73: "Education should not train students to accept what people around them accept, merely for the reason that most people do. (There probably are other reasons why students could 'accept' what is done in society, but this isn't what Boulding wants. Certain images are to be discouraged (the necessity of national

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defense) and certain others that people 'accept' (we all belong to the human race, which means we have needs and desires in common) should be emphasized and strengthened. The difficulty arises largely from the fact that there is probably as much, if not more, evidence that would contribute to the image that national defense is necessary as there is evidence to the contrary. Boulding wants a major change in image formation based on selected evidence. In areas where the public image does not conflict with Boulding's desired images, it is obviously all right to accept it, although reasons should probably be given in any case.)"

Discourse-Unit #102

Stevens, page 74: "But [scientific curiosity and questioning] to what end? The scientific image does not yield truth, only another kind of image. Are students to be taught to question eternally? This may be an ideal solution for Boulding, but it is practically impossible. At second thought, it would be undesirable if no deliberate social action ever resulted because of eternal vaciliation. The apparent flexibility of Boulding's own image of schooling and science is most hampering."

Discourse-Unit #103

Stevens, pages 75-76: "The difficulty with organizing the public school curriculum around the social

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sciences comes in the recognition that society, which operates largely on folk [folk-literary] images, has not yet granted the social sciences autonomy. The physical and biological sciences have pretty much won their battle, for the general public no longer sees the sophisticated images of science as a threat to their values. (This is arguable. For example, recent developments of bio-genetics which suggest the practical possibility of maturing a human fetus in a laboratory test tube is certainly a threat to majority values of family and motherhood.) To win autonomy, the hard sciences had to insist they were value-free, having to do with facts, not idea-systems. This is a partial truth, at best."

Stevens, page 76: "The social sciences cannot make this claim, for they do teach values. Their subject matter is often controversy; research into social problem areas produces conflicting results which are defended depending upon the particular folk [folk-literary] image possessed by the researcher. In many areas the images of social science contradict prevailing folk [folk-literary] images in the majority of people. For example, the anthropological perspective of viewing July Fourth celebrations as 'tribal rites' may be highly insulting to patriotic citizens. The teacher in this social science area cannot ignore the problems caused by conflicting

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images, nor can he pretend there are simple or unequivocal answers to them."

Discourse-Unit #104

Stevens, page 77: "If Boulding believes that the skill of learning is the greatest hope for society, the teaching-learning institution which holds most promise for the future is the university. (Boulding has earlier maintained that society is the educator. I would assume what he is driving at here is the idea that the university through its research facilities promotes image change that will spread out through society. Artists could be said to do this, as well, through painting, drama, literature, poetry and music. Perhaps Boulding does not mention the artistic aspect because he is concentrating on image change achieved through science. However, he has given no logical reason to prefer scientific methodology to the arts.)"

Discourse-Unit #105

Stevens, page 82: "Boulding never says public schools as now administered could not adapt to his proposed changes, in fact, he wants them to. It is just that once they have adapted, logic seems to demand protection from any further changes."

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Discourse-Unit #106

Stevens, page 84: "Boulding does not specify how to implement these attitudes [teacher expectations of student learning advocated by Boulding] . . . it may be he doesn't think this very important."

Discourse-Unit #107

Stevens, page 84: "The logical ordering of learning tasks is simply ignored. Boulding is not a professional educationist and he may not be aware this is necessary for good teaching, or he may feel such techniques are already possessed by teachers. Considering his idea of system organization and presentation, the logical ordering does present a problem. Should the linear pattern be introduced first? Or may all systems be taught simultaneously, depending on the subject the teacher is emphasizing? There are no clear guides to presentation."

Discourse-Unit #108

Stevens, page 85: "Boulding is concerned that teachers let their students know how they are progressing, or failing to, in their studies. He sees the evaluation process as a key element in the social world, as well as the school environment. The most important aspect of this is that the teacher give the student the feeling that he can correct his mistakes,

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rather than the impression that the student is not a good student and will continue to make mistakes. Boulding admits he does not know how to do this, but he thinks it makes the crucial difference between good and bad teaching."

Discourse-Unit #109

Stevens, page 85: "Boulding is rather vague about this aspect of schooling [curriculum], since he believes it is not so much what, as how one teaches that matters. . . . Science should be taught for its method and approach, not for its specific content. All traditional subjects . . . should be taught with an openness to new ways of procedure and new observations or additions."

Stevens, pages 85-86: "This vagueness and generality about curriculum would leave a convert to Boulding's system with a serious problem of selection. He has said that schools must decide on the 'minimum a student needs to know.' The student must learn 'a vocabulary and conceptual contexts.' What vocabulary and what concepts? Where do you draw the line at a minimum of facts? Does each teacher or each school decide this? Probably not. Boulding gives no criteria for inclusion and this could be a serious handicap to anyone wanting to implement his teaching theories."

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Discourse-Unit #110

Stevens, page 155: "The distinction [Don] Price holds between truth and power becomes difficult to maintain when Boulding insists that 'The nature of the decisions of the powerful is enormously affected by the nature of the truth they perceive, and particularly the nature of the truth about social systems."

Stevens, page 155: "The difficulty between the two points of view can probably be expressed epistomologically [sic] in this way: Price believes truth exists and is verifiable; Boulding doesn't."

Stevens, page 156: "Actually, this is not being completely fair to Boulding. Although a discussion of truth is not possible, a discussion of what is not truth would be very useful, from his point of view. To be more precise, what Boulding may be after is an inculcation of uncertainty. He fears and rejects positive assurance in any area, and would have a seed of doubt planted in everyone's mind with relation to everything. As mentioned earlier, this uncertainty unfortunately does not seem to extend to the fallacy of national defense and the abhorrence of force and violence. Never once in any of his publications does Boulding doubt the correctness of his views in these areas, though he often doubts his success in persuasion on the subjects."

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Discourse-Unit #111

Stevens, page 157: "It is his contention that modern politicians are suffering from 'Munich trauma,' having overlearned the lesson from World War II. The prevailing tone that suffuses this article however, is one of quiet despair. Boulding does not really believe the political system is open to different ideas in the area of national defense."

Stevens, page 158: "These passages were published in 1964; Boulding has never repudiated them in print, although it is clear in later writings that his faith in the obvious usefulness of good ideas has been badly shaken."

Discourse-Unit #112

Stevens, page 163: "some of the worst crimes in history have been committed by people who held a good idea intolerantly."

Stevens, page 163: "National defense is not purely a political problem for Boulding, it is a moral and religious one, as well. Although he discusses the war industry at length, he always characterizes it negatively."

Stevens, page 164: "In short, Boulding really cannot look objectively at a social situation which outrages and depresses him."

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Stevens, page 168: "When Boulding's writings are looked at more closely, he does not carry this commitment of doubt into all areas. . . . the use of force to prevent injustice is not explored. It may well be that Boulding has already done this personally, but he does not inform his readers of that process."

Discourse-Unit #113

Stevens, page 169: "Boulding is worried about planning; he does not trust the man with the blue-print. . . . Although Boulding's criticism of social ills (defense systems, pollution) would logically require broadly-based and immediate social change, Boulding places his emphasis on arousing individual concern. . . . Social planning, one senses with Boulding, is not so much positive, as negative. It is more a delineation of areas that will be left unplanned, or a breakup of oversize organizations into smaller units."

Discourse-Unit #114

Stevens, page 170: "[Boulding's] theory takes little, if any, account of brute facts of necessity in the environment that tempers action. Images are the solely determining factor of social change, and men have the capability to make the world in their image."

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Discourse-Unit #115

Stevens, page 171: "Boulding clearly recognizes the dangers in uninformed social activity, but he believes education is enough." "[He fails to take into account] that some people have more knowledge than others."

Discourse-Unit #116

Stevens, page 172: "Don Price [Boulding says] 'is a nationalist, not a humanist.'" "[Yet a nationalist] is no less a humanist for his particularity; . . . genuine conflicts develop between desires and actions of men which [contrary to Boulding] may necessitate forceful resistance or violent action before they are resolved."

Stevens, page 173: "Boulding probably would not move unless he were convinced the action was completely right. Boulding's attitude could result in either complete immobility from the reluctance to impose any risky action, or the sweeping commitment to social change regardless of individual distress (short of death, I imagine) if he were convinced it was right. It is interesting that Boulding condemns the Soviet socio-political action of the collectivization of agriculture that sentenced 6 million people to starvation. No economic or political advancement is ever worth such price. Yet, one wonders if Boulding would accept the responsibility for the possible dead millions should

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United States disarmament tempt Russia to launch an attack?"

Discourse-Unit #117

Stevens, page 173: "The post-civilization Boulding envisions coming with the transition of modern society is supra-national or international. It is a generalized culture with a lack of specific differences between class and creed. . . . [Boulding fails to see] humanity defined through its particularity, a person becoming fully himself as he reflects his values and aspirations against those of the past and of his contemporaries."

Discourse-Unit #118

Stevens, page 174: "Boulding is certain nothing good will come from war anymore, and the use of force to keep order is an unhappy necessity he would rather not discuss at length."

Discourse-Unit #119

Stevens, page 175: "With Boulding's religious orientation, it is belief that is all-important, and belief determines action. Actions may differ, but if they stem from the right beliefs they cannot be wrong. . . . Boulding's literary style has the sweep and flame of an appealing sermon; he is obviously out to make converts."

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Discourse-Unit #120

Stevens, page 177: "Boulding's problem with images has been raised . . . If meanings are only inferred, men are still lost in a solipcism where they can never be sure communication is achieved, or even if there is anyone else with whom to communicate. Images can only be compared with other images, not reality."

Stevens, page 178: "He insists no one method is better than any other to discover the truth. . . . In the last analysis, Boulding places his faith in common sense as truth, and thus has difficulty when he wants to make a case that common sense errs. It is unfortunate that he chose to raise the question of epistemology at all in his writings. He might well have been better off expressing a theory of images and letting others interpret his epistemological position."

Discourse-Unit #121

Stevens, page 181: "In Boulding's analysis, valuational images are the most important learnings; if the spirit or attitude of students is good, he does not concern himself unduly with content."

Stevens, pages 181-182: "Boulding is sensitive to classroom atmosphere, but he does not know how to structure the environment in order to achieve the optimum development of desired attitudes. By stressing psychology, Boulding runs the risk of ignoring the

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logical demands of the teaching-learning situation. It is not enough for teachers to develop humane, sensitive students open to new experiences; teachers are also charged with training and/or encouraging intellectual development in students. Without logical structure and an emphasis upon valid learnings in subject matter, teaching degenerates into 'mothering.'"

Stevens, page 182: "Both of them [Daniel Bell and Kenneth Boulding] fail to understand a vital problem for professional educators is not what the best teachers in the finest schools would do with either theorist's suggestions, but what happens to either suggestion at the lowest level of practice in the schools. This is an aspect of the problem of advocating particular changes in education which neither theorist considers."

Discourse-Unit #122

Stevens, pages 182-183: "Boulding's suggestions for education lack specificity; they are general and vague, entirely in keeping with Boulding's mistrust of blueprint and structure in society. However, with this approach he shows a lack of perception about the nature of schooling, since he assumes education can be what teachers want it to be. If this situation obtains at the level of college instruction where Boulding has gained most of his experience (and there is evidence it does not do so uniformly) it certainly misrepresents the situation

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at the public school level. . . . Studies . . . have suggested that the teacher has very little choice within the framework of institutional expectations to change subject matter orientation or methodology. It would seem Boulding's assumption that teachers can institute educational reform is not currently an accurate assessment of possibility."

Stevens, page 183: "[Boulding lacks] understanding of the institutional demands of schooling, particularly its political nature."

Discourse-Unit #123

Stevens, page 185: "when Boulding issues a call for universities to assume spiritual leadership of social evolution he is not really certain the leadership forthcoming will be of the kind and quality he wants."

Stevens, page 185: "Neither Bell nor Boulding consider the university to be a microcosm of society; both see it as a specialized place apart from certain kinds of social stresses and concerns. . . . As befits such a special institution, the university must be free to ask dangerous or unpopular questions."

Stevens, page 186: "The ties between government and academe which Daniel Bell accepts and welcomes, fill Boulding with foreboding. He fears federal funding of particular projects has already hopelessly biased university-based research."

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Discourse-Unit #124

Stevens, page 186: "A serious error of omission committed by both theorists is that they seem to ignore the problem of the student whose terminal degree is a high school diploma. Boulding is less obvious about this; he keeps insisting education is vital because it imparts images which affect the quality of an individual's life. People must be taught flexible image systems so they can continue to grow and develop all through life."

Stevens, pages 186-187: "Does the public school owe some of its students the kind of education or training which would make them employable in society? . . . Boulding wants the school to create and reinforce images, among them the image of oneself as a human being with unique attitudes and capabilities, yet part of the family of man who inhabit this planet. It is not up to the schools to decide what an individual does with his unique capabilities; psychological emphasis should stress individual choice and responsibility. . . . This attitude ignores the plight of students to whom a career is a necessary or felt obligation. Since everyone obviously cannot become part of an elite group of planners and theorists, what happens to the main segment of society?"

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Discourse-Unit #125

Stevens, page 187: "both [Bell and Boulding] are essentially out to return education to the ancient liberal tradition, that is education seen as a liberalizing influence, a force that frees a person to be most human, to fulfill his potential as a man among other men. They diminish the idea of education as a personal economic advantage, and lay most emphasis upon the intangible benefits that accrue to the well educated."

Stevens, page 188: "When he [Boulding] discusses personal economic benefits, he does so to make the point that some (most?) individuals can afford to finance their own education because of their expectation of increased income. The point of his analysis is that inequities in educational advantages might be alleviated if people who can, or expect to be able to afford to pay for their own education would be forced to do so."

Stevens, pages 188-189: "both theorists [Bell and Boulding] would opt for the fusion [of the scientific and the literary] or third culture form of education. Men need both science and humanity. Science bears practical hope for alleviating social ills and building a more humane future society; the humanities carry the inspiration which makes men want to perform such actions. . . . Unfortunately, this educational proposal is often construed as an aristocratic or elitist

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one . . . This does not have to be the case. . . . Curriculum proposals can, and have been constructed which take account of the concerns of the 'average man' without losing quality standards."

Discourse-Unit #126

Stevens, page 189: "It is not enough to have interesting and challenging ideas about how to change education. Some assessment of their practical application is needed before such suggestions deserve to be taken seriously."

Discourse-Unit #127

Stevens, pages 189-190: "At no other time has society ever possessed the tools to guarantee social manipulation on a mass scale, and Boulding fears this, just as he fears total nuclear destruction. . . . Thus, Boulding presents something of an anomaly, writing to obtain reasoned consent for plans that gain much of their attraction from the fearful consequences he envisions if his words are not heeded."

Stevens, page 190: "Boulding's theory of images is not clearly defined."

Stevens, page 190: "Boulding's theory is broad and general."

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Gordon Tullock as Critic

Discourse-Unit #128

According to Tullock, page 185: "I noticed a couple of trivial errors in areas where I am something of a specialist but they are trivial and make no difference to the general argument."

Tullock, page 185: "For example, he says 'the iconoclasts of Byzantium may very well have been influential in laying the ground for Islam and the simplicity of the mosque' (p. 198). In fact, the iconoclasts were a response to Mohammedan success."

Discourse-Unit #129

Tullock, page 185: "He also feels that 'group territoriality which is occasionally found is the worst of all possible strategies because it involves fighting, which may be damaging and it also means that the population of the species will be limited by the food supply rather than by the territory. Such species are in the worst of all possible worlds' (p. 255). Hyenas, wolves and lions are all quite successful in spite of following this particular strategy. It can be argued that most ants are of this sort although here we have some problems with definition. But perhaps Boulding's Quaker religion affects his judgement here."

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Discourse-Unit #130

Tullock, page 185: "this book spans almost the whole of human knowledge. Those of us who are specialists in any one field are apt to find that we have little to learn from Ecodynamics in that particular field. Still, it is fairly certain to widen the horizons of most students."

Discourse-Unit #131

Tullock, pages 185-186: "I do, however, have what I think is a fairly serious criticism. The book bears, a subtitle, 'A New Theory of Societal Evolution'. In my opinion there is no general theory in the book and the book is to a large extent not particularly evolutionary. It would, of course, be unfair to criticize a book not for itself, but for a descriptive phase in the title, but I fear that many readers will be swept along by Boulding's undeniable knowledge and enthusiasm, and think they are reading a single theory. In fact, the book is a large collection of individual theories which are not fully integrated into a larger theory."

Tullock, page 186: "Further, although some of these theories depend on evolution a great many of them depend, as for that matter most economics depends, on rational choice models. . . . the policies which he recommends are certainly in many cases the ones which I would recommend myself. Nevertheless, to urge that

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people adopt a given policy is different from saying that movement of society towards those policies is the product of evolution. . . . The fact that democracy has on the whole been losing ground since 1914 does not prove that it is evolutionary [sic] inferior any more than its immense growth and efflorescence in the period between 1700 and 1914 proved that it was a superior system. With rather small samples of societies drift dominates natural selection in the societal sphere."

Tullock, page 186: "the implication of his subtitle, and indeed some of the text, albeit not by any means all of it, that his science is devoted to deducing what will evolve or what must evolve rather than suggesting what would be desirable, is misleading. If you disagree with him, there is a fair chance that you are wrong because he is in fact a very acute reasoner, but you should worry about the possibility of intellectual error, not that the gods of evolution are against you."

Tullock, page 186: "Boulding is both a wise man and a scientist. . . . He has taken a large number of theoretical and empirical discoveries of economic, biological and other sciences and has woven them together. The pattern in which they are woven, however, is not a scientific one, but . . . a poetic one. . . . The outcome is a very attractive book and a book which

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will benefit many readers. It is not, however, 'A New Theory of Societal Evolution.'"

John J. Voynich as Critic

Discourse-Unit #132

According to Voynich, page 187: "Boulding's [conflict] models are predicated on irrational behavior and conflict is assumed to be a function of anger and irritation. This assumption may be a significant flaw, for much of the conflict in the world seems to be the result of calculated conflict of interest and not simply emotional and irrational wrath. Conflict is often a process of deliberately seeking maximization at a cost to another and therefore already lies on the contract curve. No evidence exists to show which conflicts have been irrational and which were instigated for profit. Presumably both factors are present and the problem becomes one of relative importance."

Voynich, page 187: "While Boulding's [conflict] models serve as first approximations, they nevertheless point in the direction of a more general theory of conflict resolution."

Discourse-Unit #133

Voynich, page 188: "Boulding's analysis is a systematic and highly organized approach to the investigation of conflict phenomena. However, it seems

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to place strong emphasis on science as the sole base for determining human action. The danger here is that the highly formalized models may encourage the illusion that all phenomena can be described and predicted by mathematical laws. Boulding's stress upon the immense complexity of social organization must be kept in mind."

Discourse-Unit #134

Voynich, page 192: "His analyses of social phenomena are presented in the light of these strong moral convictions. His views are conditioned by the belief that meaningful results can take place only within the framework of the integrative schemes of human affairs."

Voynich, page 192: "Boulding seeks in philosophy and theology a revival of humanistic concerns for society."

Voynich, page 212: "Perhaps the most perplexing issues raised by Boulding's ideas are ethical and methodological rather than economic. There appears to be a curious dualism between a sort of scientific positivism and ideals which are seen in the background of his thinking."

Voynich, page 213: "Boulding leaves his readers at once apprehensive and exhilarated. The exhilaration comes from the promise of his optimism, and the apprehension stems from concerns about the workability of

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his integrative system and his utopian concepts. Perhaps most of this apprehension stems from one's own distrust of mankind's ability to resolve its problems by relying on purely altruistic motives."

Voynich, page 214: "the Golden Rule . . . may require outside influences and constraints to encourage man to seek his altruistic ends."

Discourse-Unit #135

Voynich, pages 214-215: "While Boulding stresses these ends and calls for a polylithic society, not enough analysis is devoted to this aspect of man's individuality. Boulding may be seen as too preoccupied with seeking the utopian solution without fully considering those abstruse social and psychological considerations called for in his interdisciplinary approach to social phenomena. His one-world concept, his disdain for nationalism, and his call for supra-powerful forces to evoke a 'proper' response from mankind imply an imposition of power to enforce rigid standards determined by an intellectual elite at the one extreme and an unworkable and unenforceable mediocrity at the other. Some middle ground approach may be possible but this is unlikely to be the sophisticated integrative system that Boulding hopes for."

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Discourse-Unit #136

Voynich, page 215: "His view of social phenomena involves an historic sweep. His is not the perspective of the pragmatist or of one dealing with the harsh brutalities and complexities of the day. It is an Olympian view espousing altruistic concepts with constant reminders that salvation is in 'meekness' rather than in initiative and aggressiveness. It is unlikely that mankind will accept Boulding's alternatives as solutions. If, indeed, man believes in a 'Holy Spirit,' a containment of his brutal tendancies is desired and may be even necessary for his salvation. It is more likely that this will be possible through reasonable application of rules and their enforcement rather than any integrative scheme of affairs. The problem, then, becomes one of combining a maximum of individuality with security. If a balance is to be struck, then individuality must carry the greater emphasis even at the risk of self-destruction."

Voynich, pages 215-216: "The idea that serous intellectual effort can play an important role in achieving socially desirable goals is a declaration of confidence in the human mind. Boulding's tone, while sternly professional, is at times sardonic and laced with recrimination for man. While he professes scientific objectivity, his conclusions transcend the rigid

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disciplines he applies to his analysis of social phenomena."

Discourse-Unit #137

Voynich, page 217: "Boulding might be likened to his own 'heroic man;' as one driven by the fires of his inner volcano. His passion for ends and his identification of goals and objectives are strongly colored by his personal beliefs of what he considers to be proper for mankind. But he proposes alternatives, not as one of the "ignorant Christians," but as a responsible, scholarly, critical, and inventive scientist seeking a professional and sophisticated solution to the highly complex situations of the social sphere. If criticisms are to be voiced, it is not in the area of his economics or in his model construction, but in the inferences the reader may draw from Boulding's work. He implies that solutions to man's problems have escaped him because of his unwillingness or inability to formalize his analysis or to face up to his essential problems."

Voynich, pages 217-218: "Boulding's vulnerability may be in his own preoccupation with formal models and in his assumption that formal logic provides a pervasiveness that holds the ultimate solution when man has come to recognize its value. Mankind progresses and at times even regresses, but to assume that decisions today are more important than those of the past or of the future

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attributes to the present a transcendent importance which may be questioned. This assumption of the control of one's destiny may be unrealistic, just as such control may prove to be undesirable. To the extent that continued social improvement is desired, this capacity to control has value. Beyond that, as an ultimate solution, there may be in any such concept of a totally ordered environment a finality which may be indistinguishable from oblivion."

Voynich, page 219: "His synthesis and his methodology are developed in terms of providing an arsenal of analytical tools which may be used to explain any economic system in any time and place. The effort is a highly formalistic one which often leaves the impression that he seeks to reduce economic science to the level of tool making. Boulding's method and his innovations imply that the body of general principles and the discipline of logic may be applied to the interpretation of all economic and social problems, past or present. This is carried even further in his general systems theory and his conflict resolution. This mechanistic outlook may not be wholly helpful in a world where change is the order of the day."

Voynich, pages 219-220: "Boulding's formal analysis gives much attention to the shape and form of his theorizing. Gaps between theory and reality are

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often filled with the aid of hypothetical data and positions arrived at by virtue of a logically constructed thought system. However, the propositions rest on the assumption that theory lies on a broad foundation of the study of human nature and its most fundamental concepts can be applied to all conditions of mankind."

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NOTES

1. Vivian L. Wilson, Bibliography of Published Works by Kenneth E. Boulding (Boulder: Colorado Associated University Press, 1985). Subsequently Wilson has compiled annual updates (additions) to this work.

2. The 25/34 works are referenced in the present study's Selected Bibliography.

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CHAPTER 5

DISCUSSION AND RECOMMENDATIONS

In the previous chapter, seventeen works offering significant criticism of Boulding were located; more specifically, 137 discourse-units critical of Boulding were identified. In addition, the appendix to the present study examines each of the 137 discourse-units case by case; in the appendix the reader will also find apologies to both Boulding and his critics for any unfairness resulting from the methodological constraints of the investigation. In the present chapter, the discourse-units or criticisms of Boulding which are specifically education related are summarized and evaluated; then Boulding's philosophy is rationally reconstructed for the purpose of engendering or identifying some of its education related implications; in addition, recommendations are suggested for further research.

Summary of the Education Related Criticism

We now shift our attention from criticism of Boulding in general and focus more specifically on

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education related aspects of the criticism. These education related criticisms of Boulding may be characterized as follows:

1. Boulding contradicts himself: On the one hand, he says that we "know very little about the relation between the human genetic structure and the human phenotype." On the other hand, Boulding maintains that the "processes by which each generation of human beings learns from the last are far more important than the process by which biological genes are inherited." (See discourse-unit #9.)

2. Boulding's threat-exchange-integration model of the kinds of motivations for learning or of the kinds of organizers of behavior favors the exchange component more than it should. (See discourse-unit #34.)

3. Boulding's view of human nature is too romantic. Boulding is unrealistic in that he sees humans as fundamentally good rather than sinful. (See discourse-units #47, #50, and #129.)

4. Professor Boulding's teaching is chaotic and unstructured. Likewise, he is a lone thinker (not a team thinker); and his unstructured, chaotic approach also makes him a poor administrator. (See discourse-units #55 and #56.)

5. Boulding's understanding of, or speculations about, the evolution of the hominid brain are mistaken;

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accordingly, the human brain may be more limited and less redundant than Boulding thinks it is. (See discourse-unit #59.)

6. Boulding is mistaken in thinking that we learn only from our mistakes. (See discourse-unit #60.)

7. Boulding is mistaken that animals have no feelings or that other primates do not experience emotions similar to those of humans. (See discourse-unit #61.)

8. Boulding is mistaken that learning is Lamarckian; contrary to Boulding, learning is not a biogenetic process. (See discourse-unit #62.)

9. Boulding is mistaken in his belief "that biological evolution is approaching its end and that it will be succeeded by an evolutionary process wholly dominated by noogenetic processes directed by human values" and that there "is a reasonable hope in all this for at least a long-run 'time's arrow' toward betterment." (See discourse-unit #70.)

10. Boulding simple-mindedly tends to see economics or exchange as good and politics or threat as bad; surely only a simple mind would uphold Boulding's view that it "is the processes of growth and production rather than of conflict that are really significant." (See discourse-unit #73.)

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11. According to Boulding's eiconic model of learning, everything is determined by images, without reference to reality. Boulding is mistaken in believing that images and only images determine all interactions and all modifications of all systems. (See discourse-units #88 and #114.)

12. Boulding is mistaken in his belief that raw data do not provide us with what we call facts. (See discourse-unit #89.)

13. Boulding's eiconic model of learning gives us only images, not truths. (See discourse-unit #90.)

14. Boulding fails to tell us how to judge when a scientific image is false. Boulding fails to admit that his eiconic model of learning is solipsistic. Boulding does not believe there is such a thing as truth, yet he thinks there are misleading or false images. Boulding talks of the importance of reality testing, yet he has no criteria of truth. Boulding here contradicts himself. (See discourse-unit #92).

15. Boulding defines education as image change; this vagueness means that his articles on education rarely deal with schooling. (See discourse-unit #94.)

16. Contrary to Boulding, there is no guarantee of exact transfer of images in teaching. Also, Boulding sometimes speaks of schools as threatening institutions, sometimes as integrative. (See discourse-unit #95.)

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17. Boulding is incorrect when he insists that threat accompanies rigid images and goodwill goes with flexible ones. Moreover, Boulding's eiconic model fails to provide an adequate way to distinguish good image modification (i.e., learning) from bad. (See discourse-unit #96.)

18. Boulding wants to teach that everything depends on everything else, that society is like a pond. Yet in fact a society is not a pond; moreover, the analogy does not help us distinguish the more important from the less. (See discourse-unit #97.)

19. Contrary to Boulding, evolution or learning should be equated with creativity rather than change. (See discourse-unit #99.)

20. Boulding is mistaken in believing that there is no one best way of doing something. But Boulding seems inconsistent here, for he apparently does not hold this belief when it comes to matters he deems important or urgent. Boulding puts himself in a self-contradictory position when he insists that no one method is better than another in obtaining truth. (See discourse-units #100 and #120.)

21. Boulding wants schools to teach the images he wants them to teach, and not others--yet Boulding's selection of the evidence and images may be biased or mistaken. (See discourse-unit #101.)

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22. If, as Boulding wants, we are to question eternally, we would never engage in social action for human betterment. (See discourse-unit #102.)

23. Boulding's call for more social science research and teaching is unrealistic in that it is local culture and its images which would encourage such controversy or make this determination, if at all. (See discourse-unit #103.)

24. Boulding apparently prefers scientific knowledge to artistic knowledge, but he gives us no reasons for this preference. (See discourse-unit #104.)

25. Boulding wants to change the educational system, then protect it from further changes. (See discourse-unit #105.)

26. Boulding fails to explain how to implement his notion of proper teacher attitudes toward student learnings. (See discourse-unit #106.)

27. Boulding wants all students to learn about the dynamics of various kinds of general systems, yet he ignores how such learning tasks should be logically ordered. (See discourse-unit #107.)

28. Boulding wants to give students the feeling that they can correct their mistakes; Boulding admits he does not know how to do this. (See discourse-unit #108.)

29. Boulding is vague about curriculum; he wants to teach images and skills and openness--rather than

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content. What would be the content of this core curriculum and who decides? Boulding supplies no answer. (See discourse-unit #109.)

30. Boulding does not believe that truth exists and is verifiable. Yet he is convinced that our schools should teach certain images but not others. (See discourse-unit #110.)

31. Boulding appears unwilling to question certain of his beliefs, rather than be open to learning. (See discourse-unit #112.)

32. Boulding is unrealistic in thinking that the way to cure social or educational ills is by arousing individual concern, rather than by social planning. (See discourse-units #113 and #115.)

33. Boulding believes individual psychology, not the structure of the environment, determines learning. Boulding believes in making students sensitive rather than competent. Boulding fails to consider what would happen to his suggestions at the lowest level of practice in the schools. (See discourse-unit #121.)

34. Boulding offers vague ideas rather than specifics. He mistakenly assumes that education can be what teachers want it to be. Boulding fails to address the political nature and institutional demands of education. Boulding wants universities to assume responsibility for world leadership, yet Boulding's own

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analysis seems to show that universities are hopelessly biased toward nationalistic concerns. (See discourse-units #122 and #123.)

35. Boulding tends to ignore educational issues below the college/university level. The economic and career needs of those whose terminal degree is the high school diploma are left unaddressed. Boulding tends to emphasize the intangible, rather than the economic, benefits of becoming an educated person. (See discourse-units #124 and #125.)

36. Boulding's educational ideas should not yet be taken seriously, since they have not yet been assessed by Boulding (or anyone else) from the point of view of practical application. Boulding's educational philosophy tends to be broad, general, and not clearly defined. (See discourse-units #126 and #127.)

Evaluation of the Education Related Criticism

The numbering of the evaluations below is meant to parallel the numbering of the education related criticisms which appear in the previous section:

1. On the one hand, Boulding says we know relatively little in detail about the relation of the human genotype to its phenotype. On the other hand, Boulding says that in general it appears that a human brain has great potential for flexibility and learning;

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there are a wide variety of human cultures. Sometimes Boulding seems to say that noogenetics dominates biogenetics in humans, other times he appears to say that the human species is now (with the advancement of biological science and genetic engineering) on the verge of this being the case. But certainly one can at least imagine a great gulf between a highly educated human and a feral human, even given that the two are genetically identical.

2. Whether Boulding's threat-exchange-integration model favors exchange too much is a question. After all, Boulding is an economist. On the other hand, integration is more important in Boulding's model than is exchange or threat.

3. If the ideal person combines idealism with realism, is Boulding too romantic? Is Boulding unrealistic in his (apparent) disbelief in "original sin"? The answers to these questions are open to dispute. Boulding seems to have some tendency to see humans as essentially good, but warped by outside constraints--rather than as essentially sinful. It is not immediately obvious as to Boulding's response to the person who consciously decides to do evil. On the other hand, Boulding points out that some of the most "evil" persons in history (perhaps including Hitler) were

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attempting--in an unusually active or conscious way--to do good and create a good society.

4. Professor Boulding tends to see the course text as providing intellectual order and the classroom teacher, intellectual disorder; this sometimes synergism may sometimes result in greater creativity on the part of the teacher or the student. If Boulding happens to be a lone thinker, presumably he has nothing against team thinkers--perhaps both are needed. According to Boulding, a good educational administrator would not fit nicely as a cog in a machine, or revere efficiency or red tape; rather, an administrator should attempt to act with courage, foresight, and enthusiasm.

5. Although Boulding speculates about hominid evolution, Boulding readily admits that this is speculation on his part. Boulding admits that he does not know how the growth of the hominid brain over millions of years in fact conferred survival. His point is that whatever the factual reasons for this evolutionary development may be, the human brain is a very redundant organ which a short-sighted efficiency expert would have considered rejecting. The hominid brain evolved and survived in the absence of Beethoven's Ninth Symphony--yet nevertheless the human brain has the capacity for producing such wonderful "excesses." Much of the human brain is hidden or recessive and has never

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become manifest due to lack of a sufficiently evolved sociosphere. Boulding is claiming that one of the principles of evolution is what he calls "joint genetic production": Biological genes act in an interactive way with each other and the environment.

6. Boulding's actual position is that reinforcement simply strengthens our worldview, whereas disappointment causes us to question it, thereby encouraging the possibility of a more profound process of learning. Boulding is not beyond using words to make it appear that he is contradicting himself when actually he is not; some readers will thus dismiss Boulding as inconsistent, while others will read again for his (often not inconsistent) insights. Too, Boulding emphasizes the importance of perceived payoffs in terms of how they influence our learning/mislearning and behavior/misbehavior.

7. In fact, Boulding believes animals have feelings, and he believes that many, but not all, emotions experienced by humans are also experienced by other primates.

8. With his reference to Lamark, Boulding is stating that there are two "genetic" roads to learning or evolution--biogenetics (genes) and sociogenetics (images or memes or culture). Biological genes are reproduced and so are cultural/subcultural images. On rare occasions a mutation (whether biogenetic or sociogenetic)

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will be fit enough to be selected for transmission to future generations.

9. Boulding's actual position is that in the very long-run evolutionary process, there is some overall tendency toward complexification (e.g., his notion of "the empty niche" and that there is "room at the top"), not that complexification is inevitable in the short run. Boulding believes that we must learn the insights provided by the so-called "prisoner's dilemma." Boulding's point is that if humans do not learn/evolve a sense of flexibility and benevolence in time, the human misadaptation may result in human extinction. To the extent that humans survive and advance, it seems that noogenetic (i.e., sociogenetic) processes will become increasingly more important for the course of evolution. What Boulding advocates is not civilization or precivilization, but postcivilization. It appears that the human species will either continue to misadapt and become extinct, or learn and become postcivilized. It is easy to romanticize precivilization, but virtually no precivilized human was concerned with the welfare of the entire human species. On the other hand, some present humans have learned, and perhaps many future humans will learn, concern for the welfare of the entire human species. Moreover, fewer people believe in <u>laissez-faire</u>

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capitalism and "social Darwinism" at the end of the present century than at its beginning.

10. Boulding believes that the good society would contain all three factors--threat, exchange, and integration--not one or two factors. Moreover, Boulding believes that each of the three systems may develop (and historically have developed) pathologies. On the other hand, integration is the most necessary or powerful of the three systems; and the integrative system would be especially important to a postcivilized society. Everything else being equal (which they rarely are), we should prefer exchange to threat, and integration to exchange or threat. Although threat has been very important for the productive growth of civilization, it usually is not very important whether it is X or Y who wins a particular war--from the distant perspective of the long-term course of evolution, or so Boulding maintains. In order to make the great transition to postcivilization, Boulding suggests that we develop philosophies which favor world integrative growth, economic development and conflict management so as to help overcome the pathology of war and the malevolence of philosophies fixated on the winning of fights.

11. In fact, Boulding coherently believes both that one's image is the basis for one's (attempted) behavior and that reality determines, or helps determine, the

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results or payoffs of that behavior. Boulding as philosopher specifically claims an inability to demonstrate the existence of an external reality. But tentative faiths or working hypotheses--e.g., that there is a real world of facts and of values--are necessary if one seeks human betterment.

12. It is image-interpreted data, not raw data, which gives us our perception of so-called "facts." Further, Boulding's distinction between the conscious and nonconscious dimensions of the image is useful here.

13. Many humans proceed based on the assumption that humans are structured so as to be able to more or less accurately perceive outside reality. Boulding believes humans often find this assumption or faith to be highly useful; usefulness, however, does not guarantee absolute Truth. Belief in the existence of Truth, and in the inability of finite humans to find it absolutely, are two important assumptions of Boulding's philosophy; this allows one to act so as to attempt human betterment, and to so act humbly rather than dogmatically.

14. As indicated in the paragraph above, it is incorrect to claim that Boulding believes that there is no such thing as truth. Boulding believes, however, that we should be open to the possibility that our image is imperfect; moreover, the image acts as a filter, conscious and nonconscious, which serves as our criteria

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of so-called "validity." Our conscious and nonconscious criteria of truth change; what the ultimate criteria would be is uncertain. Many human images find it more useful to disbelieve in solipsism than to believe in it. Likewise, many human images find it useful to believe that good faith dialogue may advance human betterment. If all humans belong to the same species, then they may share certain fundamental structures permitting a common task of human betterment. For example, all humans have the ability to imagine that all humans belong to the same species. Since reality (in both facts and values) exists, some images are better or worse than others--hence, again, the importance of good faith dialogue among humans. Many human images value human betterment rather than human extinction. Many human images value realistic feedback over peaceful dogmatism. Although Boulding believes it important to have both literary and scientific knowledge, scientific knowledge in general tends to be more accurate. Accordingly, as a general (not absolute) rule, it is desirable that one's literary knowledge not contradict one's scientific knowledge.

15. The notion of education as knowledge increase, or as image formation and image modification, is not vague or imprecise but integrative and realistic. Formal education may then be perceived unambiguously as a subset

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of education. Many of Boulding's articles deal with education; many deal specifically with formal education.

16. Boulding does not believe that there is any guarantee of exact transfer of images in teaching. Boulding does emphasize respect for the inward teacher (a person's image or worldview) although the goal is to modify one's inward teacher or worldview. Teachers and students may or may not share knowledge with each other; nevertheless, the sharing of knowledge, unlike the using up of energy, is not subject to the law of entropy. Boulding believes that formal education should be less threatening, and more integrative, than it historically has been. Boulding here sometimes seems to want it both ways: wanting the system of formal education to be more integrative, yet seeing the necessity of threat. For Boulding, a goal of formal education should be to assist students in tentatively finding their own identities or worldviews, yet the student should learn to be flexible and curious and concerned and disciplined enough to engage in lifelong learning.

17. Whether threat accompanies rigid images, and goodwill goes with flexible ones is a question. Because Boulding does not claim to have any final unquestionable philosophical answers, presumably Boulding would encourage the advancement of the philosophic study of the science of eiconics. Without a change in the image, no

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learning occurs. Yet an image may change in a good or bad direction. Presumably an emphasis on philosophic reflection, realistic feedback, and good faith dialogue will help prevent falling in the bad direction (no guarantees, however).

18. In looking at an ecosystem (a pond; a spaceship; a planet; a society), Boulding's image that everything depends on everything else is meant to be the beginning, not the end, of the analysis.

19. Perhaps a philosophy based on creativity and entropy would be preferable to one built on evolution [variation-selection] and entropy. Since no such alternative philosophy is in fact developed and presented, however, it is impossible to say. One may interpret Boulding's approach as including both creativity/variation and selection (along with entropy) as major elements; the alternative approach may be less appealing in that it apparently only includes creativity/variation (along with entropy) as major elements.

20. Boulding emphasizes the importance of an image which is flexible. What is deemed best depends on criteria, but the criteria are embedded in an image with conscious and nonconscious dimensions. One person's image or criteria will differ from another's; one's present image or criteria will differ from one's future

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image. One should respect the inward teacher of the other person, including one's own image--present, past, future. Accordingly, no one approach or procedure is necessarily best for all inward teachers. For Boulding, flexibility is a virtue (but not the only virtue). Autonomy is also a virtue among other virtues.

21. One thing Boulding wants students to learn is that the present international system, if unchanged, may lead to extinction of the human species. It is the "prisoner's dilemma" again: Boulding wants us to learn that a new international system is necessary. Our present international image, according to Boulding, is based on (inaccurate) literary knowledge. Scientific research for peace would make us more realistic and make it easier to modify the system so as to change the payoffs. In any school system there are certain images which will be encouraged and certain others which will be discouraged; it therefore makes sense to be conscious of this, and (always tentatively) decide which images are better or worse. But one should always respect a person's inward teacher even if one is convinced that it is a bad teacher or worldview.

22. Boulding's actual position here is that we should always be open to learning but that in the meantime we should attempt to humbly act for human

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betterment based on our tentative faiths or imperfect hypotheses. Thus, the importance of good faith dialogue.

23. One may attempt to persuade both the superculture and the local culture of the importance of social science research and teaching if we seek human betterment rather than extinction of our species. A classroom teacher of social science may teach that our Fourth of July celebrations are something like "tribal rites" without disrespecting these rites or the various inward teachers (images).

24. Boulding does indeed believe that artistic knowledge is important. But Boulding puts emphasis on science because it necessarily involves a universal good faith dialogue and tends to be more universally accurate than artistic knowledge.

25. In fact, Boulding favors both the learning of individuals and the macrolearning of organizations, as well as both processes of learning continuing indefinitely.

26. Sometimes Boulding will specify how to implement his various insights, sometimes not.

27. Boulding presumably believes that individual teachers and textbooks are capable of ordering and implementing his insights in a wide variety of ways; presumably Boulding considers this preferable to the "one

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best system" approach. The book Ecodynamics is one possible ordering.

28. According to Boulding, the classroom teacher should give students the feeling that they can correct their mistakes, rather than the impression that they are not good students and will continue to make mistakes. Boulding admits he does not explicitly know how to do this or whether it is possible for one teacher to teach another how to be a good teacher.

29. Presumably Boulding believes many different approaches to curriculum are possible and that there is no "one best system." Boulding emphasizes the importance of continuing experimentation. Boulding considers this kind of ambiguity or freedom to be good; clarity or efficiency can sometimes be bad.

30. Boulding believes that the search for truth can empower people and is preferable to power over people. One can act earnestly on a tentative faith or working hypothesis and still be willing to question it. As a teacher one may encourage certain images and discourage others, even while being open to new learning or later modification. At the same time, the classroom teacher can indeed respect each student's inward teacher, no matter how apparently flawed.

31. It is doubtful that Boulding believes that he holds to any idea in an intolerant way. He is convinced,

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however, of the realistic need (in terms of human survival and betterment) to learn to modify the international system so as to change the payoffs. Boulding believes that his scientifically oriented knowledge of the nation-state system, its pathologies, and alternative international systems is more realistic than the commonly accepted literary knowledge of the international system. In one's research, one necessarily has to decide which knowledges should be advanced and set one's priorities accordingly.

32. Boulding does not believe that individual learning is enough; he believes that macrolearning, including new social inventions, is also needed. Boulding believes that planning is important but that flexibility and feedback, not unalterable blueprints, are the way to proceed. And, yes, we should plan to leave some areas unplanned, despite rumors that freedom is unjust or inefficient.

33. Boulding believes that the structure of the environment, not just individual psychology, is important in the teaching-learning situation. He also believes that teaching is more than "mothering." Students must learn to think for themselves in a disciplined fashion, for example. By respecting the student's inward teacher, the classroom teacher can assist the inward teacher in learning how to learn on a lifelong basis. And, indeed,

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perhaps it would be worthwhile to study how the best teachers would implement Boulding's philosophy concretely in the classroom, then make the same kind of study for other more typical teachers and for classrooms of low-achievers.

34. Boulding does not assume that education can be what teachers want it to be; the sociosphere is highly complex. Some, but not all, of Boulding's educational suggestions lack specificity. But Boulding cannot do everything, nor does he believe in an inflexible "one best system" approach. If a person or teacher does not believe reform is possible, then reform is less likely to occur than when it is believed that reform is possible. According to Boulding, it may be that some of the "key" reforms needed for education are located in the larger society.

35. Boulding, by emphasizing the importance of liberal education, lifelong learning, and "the minimum core" of learnings needed by all, does not entirely ignore the student whose terminal degree is a high school diploma. To what extent public education should be responsible for trainings, subjects, and activities beyond "the minimum core" is a question: Boulding believes that a properly educated person needs "frills" as well as "basics." And Boulding does indeed recognize education as usually of personal economic advantage, but

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to what extent this should be articulated as a goal of education is a question.

36. As a first step, it seems appropriate that Boulding's general social-educational philosophy would be broad and general. Given this humble context, Boulding's philosophy does not seem to be unusually poorly defined. In any case, Boulding has more than merely some interesting educational ideas. He gives reasons why his suggested reforms are needed and worthwhile. He also recognizes the need for realistic feedback if the educational system is to function as it should.

Educational Implications of the Investigation

According to Boulding, the university is the key to the future course of evolution. The university is both the primary knowledge component of the world superculture and the major interface between the superculture and the local culture (which includes national, religious, and other local elements). The university may accept this responsibility for world leadership either blindly or arrogantly. On the other hand, such leadership may require vision (not blindness) and humility (not arrogance). Accordingly, the university would promote what Boulding calls "realistic radicalism." Radicalism requires vision, including compassionate commitment and the will to human betterment; realism requires humility,

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including intellectual excellence and the will to reality testing.

Educational implications of Boulding's philosophy will be articulated below by asking the following leading question: "What would the structure of 'Boulding University' look like, and what is its mission for world leadership?" By focusing on this question, a kind of rational reconstruction of Boulding's philosophy will now be attempted.

The Structure of Boulding University

Since it is the fit (rather than the fittest or the unfit) who survive--persons, universities, or social systems should seek a golden mean or mix of basics and frills if they desire long-term survival and betterment. (Unfortunately, some persons, universities, and social systems find it difficult to satisfy even the economic basics.) All basics and no frills suggest that the system in question is near subsistence level or indigent. Its room for flexible maneuvering is limited.

One may characterize postcivilized learning as a quest for the integration of scientific and literary knowledge. Accordingly, one may envision three academic divisions to Boulding University: the Center for Scientific Knowledge, the Center for Literary Knowledge, and the Center for Integrative Knowledge. Additionally,

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there would apparently be at least three administrative offices: the B.U. office for university funding, the B.U. office for public education, and the B.U. office for faculty education. These are discussed immediately below.

Academic Divisions

Boulding University would guard against the establishment of isolated, secure departments out of touch with the problems of humans and humanity. The university would seek to establish a number of interdisciplinary research centers in touch with human problems. A diversity of schools of thought would be encouraged. Some universities may find it economically desirable to offer only a few doctoral programs, yet offer a number of master's programs of high quality. Also worthy of consideration would be a set of programs offering post-master's studies and degrees in tandem with business and government employers; the degrees might take up to two decades to complete.

Boulding University would be governed by its faculty, not by trustees or administrators. Boulding's philosophy emphases the evolutionary importance of checks and balances and the dangers of a single bureaucracy. One can envision, for example, a primal Boulding University with three divisions or research centers (rather than departments). The social science division

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would serve an integrative function between the physical-biological sciences division, on the one hand, and the humanities or arts-humanities division on the other. Philosophy, too, would have a special integrative role in Boulding's scheme, rather than function as a narrow specialization. Perhaps social science, as science or scientific knowledge, and philosophy, as humanity or literary knowledge, join hands in the integrative role. If so, one alternative possibility would be for the integrative division to be called social science-philosophy, rather than social science.

Administrative Offices

Presumably one office or aspect of Boulding University would be devoted to economic stability of the institution. These experts would be prepared to attempt to deal with such things as educational retrenchment and economic decline. They also would be expert at locating and obtaining financial backing for the university. Without proper and selective financial backing and economic stability, the university may become extinct or devolve into a typical twentieth century university. These financial experts should seek to gradually build up larger and larger reserves of liquid assets, Boulding says. They would actively seek governmental and non-governmental grants. Yet they would be aware of the dangers of being dependent on grants (for example, in the

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structuring of research). (They also would be aware of funding possibilities in the exchange economy.)

General, unmarked grants would be sought as priority one--given the present American context. This would mean that the professors would come to the university for funding, thus strengthening the university community against the "inner" forces of fragmentation from self-isolation or self-interest, and against the "outer" forces of invasion from national, religious, or other parochial concerns. Boulding wants a strong, not a weak, university culture. Boulding University seeks truth or truths, not subservience to power, whether national or religious. Boulding University is a community of scholars, not a collection of specialists.

Another office or function of Boulding University would concern itself with public relations, mediation, and political lobbying. This serves to promote the long-term viability and quality of the university, but also to educate the public and their politicians. Teachers are not machines, cogs, or mere employees; the ideal professor is an autonomous, responsible person in search of truth or truths. Creativity tolerates mistakes and encourages many ways of doing something rather than one best way. Learning is revision, not dogma. Educational efficiency is dangerous. Boulding University would be filled to its golden mean in frills and flexibility:

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informality, waste, extravagance, redundancy, freedom, trust, and experimentation. (Extravagance in the course of evolution gave us sexual reproduction and science.) A primary function of Boulding University would be to act as mediator between the superculture and the local culture. Since the superculture is a partial culture and more concerned with methods than with ends, the superculture is not always right. However the superculture modifies local culture.

Boulding University would place unusual emphasis on continuously educating its faculty. Professors who cause identity damage to their students would not be hired, or if hired, would be let go. Presumably B.U. professors would stay current and competent in interpersonal conflict management. They also would engage in ethical self-analysis: Does the professor treat the student as inferior? Are beliefs forced on students? Is the professor hostile or encouraging? Enthusiastic when teaching? Convey contexts? Convey a need for disciplined hard work to solve world problems? Teach skills, yet be oriented toward problem-solving? Cooperate with other teachers, including possible reorganization of the university so that too much ethical strain and hypocrisy will not be present? Have a sense of self-worth and of the evolutionary importance of the educational task?

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Team teaching and faculty seminars are but two ways to enhance cooperation and interdisciplinary communication among faculty. Sabbaticals, too, should be encouraged. Undergraduate introductory courses would not be taught by TAs, but by full professors or by rotation among professors (including full professors). Professors should be provided payoffs for being generalists as well as specialists. Special care must be taken that generalists and interdisciplinary studies not become undisciplined.

The business of Boulding University is to be, or to be in a process of becoming, a community of learners in search of nothing less than the entire universe, not to hire an assortment of specialists. World betterment is the explicit goal of Boulding University professors. This involves attempting to fuse the partial values of science with the integrative necessities of local culture. As professors attempt to become more responsible, more responsive to human problems, they (and the university generally) will no doubt face temptations and dangers related to corruption, conformity, and power.

The Learning Mission of Boulding University

One mission of Boulding University is to educate human persons; this includes advancement of eiconics-related research in science and philosophy. Another

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mission (discussed in a subsequent section below) is to educate societies and the sociosphere; this includes advancement of ecodynamics-related research in science and philosophy. Boulding University would not seek to indiscriminately increase knowledge, but to increase the right kind of knowledges, including their integration.

The eiconics perspective encourages broad, eclectic, integrative knowledges. Its humble epistemology is skeptical of tests of ultimate validity. It entertains many processes and principles of knowledge and organization, including those of art, religion, and science. It seeks to uncover the principles and processes of knowledge, organization, and behavior rather than rely on a single method. It is interested in truth as development, or betterment, not as unalterable dogma. Truth involves not facts, but facts and values. The perspective of eiconics seeks coordination of facts and values for orderly, organized growth. Feedback, good faith dialogue, and reality testing are perceived as crucial to learning. Mechanistics and stimulus-response give way to decision-making and responsibility based on the inward teacher, the image, no matter how imperfect.

Most educated persons seem to agree that science is an important avenue to reality testing. By being explicit in its images or models, and by attempting to specifically guard its inferences and messages from

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mistakes, science modifies its image of how things work; in this public way, science falsifies and confirms (but does not prove) various images or models. Scientific advancement of our understanding of human learning and identity formation is an important research task of Boulding University.

The amount of stress (neither too much nor too little) for optimum learning will vary from one person to another, depending on one's image or inward teacher. The image grows toward perceived payoffs, based on one's image of rewards/punishments. Likewise, learning involves readiness to learn and is discontinuous. We have expectations about the future, then the future arrives: Success suggests reinforcement, failure offers profound learning. Persons must learn not to damage the identity of others or self. One's perception of self-interest or betterment changes as one's value system is modified. A learning goal of Boulding University is to find out what it means to be a person, a good person, an evolving person.

A learning person has the will to unlearn, a flexible yet firm image, and expectations (not predictions) about the future. A learning person encourages scientific reality testing, good faith critical dialogue, the filtering or orderly loss of data, image improvement, and becoming conscious of one's

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nonconscious and of the social matrix of rewards/ punishments. Yet professors should be aware that image modification can be traumatic. Boulding University professors want their students to learn competence and compassion, and be oriented toward problem-solving and social self-consciousness. The reader is specifically referred to the section below entitled "Toward a Core Curriculum."

Boulding University seeks to develop new ways of learning, of knowledge production (research), and of knowledge dissemination. It seeks to understand the role of formal schooling and of informal education in the social system. Boulding suggests that we attempt to identify pathologies, such as physical abuse and identity damage, in schools, families, and peer groups. Since the first years of life are so formative, public pre-kindergarten education would seem to be in order, with an eye on potential individual or system pathologies. A feedback system specifically constructed for identifying and addressing educational pathologies would presumably be an improvement over our present lack of feedback.

The primary products of formal schooling are knowledge and skill. Knowledge here means, for example, that students would learn the importance of scientific reality testing and of the interrelation of facts and values. By teaching statistical sampling, students would

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learn humility (the biases and limitations of their own personal experience). And students would learn about the whole world, including its history, near and distant. One important skill to be learned is that of getting along with others (practical morality). A school also supplies custodial service and degree/diploma certifications, and it acts as a center for community activities.

According to Boulding, an educational system should plan for the future in five ways. 1) As previously indicated, system feedback should be enhanced. 2) As previously suggested, more educational research, with emphasis on human learning and identity formation, is needed. 3) The educational system should plan for the expected. 4) The system should prepare for the unexpected but imaginable possibilities. 5) Prepare for total surprises.

Boulding identifies four challenges facing the American educational system. 1) All persons should be adequately educated by society through high school. This includes a core curriculum or general education. (See the section below entitled "Toward a Core Curriculum.") A variety of schools and of educational subsystems should be encouraged. All persons/citizens should feel happy and useful. 2) We need to encourage a pluralistic or mosaic (not melting pot) society. We seek a mosaic

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educational system in a mosaic society. In mass society, we feel a need for identity (not necessarily middle class values). However, we should all learn conflict management, especially important for a mosaic society. 3) Plan for the possibility of educational retrenchment and economic decline. (This will be discussed in the following section.) 4) Remember that persons are the aim of education. Teachers should respect the student's inward teacher, no matter how flawed. The educational system should be oriented toward human survival and betterment. If we are to be successful in our transition from civilization to postcivilization, we must unlearn old values and learn new values.

Learning moral identity is of central importance. Both "basics" and "frills" are very important in learning to be a good or moral person. And, indeed, some identities are obsolete or dangerous. Human-centered, futuristic professors, teachers, and educators will seek to understand, research, and teach about human problems and possible solutions.

The ultimate resource a society produces is learning persons. All other goods are intermediate. By placing human persons and human betterment as priority one, we will desire educational experimentation, tolerate mistakes, and continue to attempt to learn.

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The Macrolearning Mission of Boulding University

According to Boulding, the postcivilizing task of the university in our time is to provide world leadership to promote the macrolearning or betterment of the sociosphere. This includes acting as a mediator between superculture and local culture. If the university is to successfully lead us into postcivilization, it must help overcome the barriers or traps preventing postcivilized living and learning. The business of Boulding University is to study the universe for the purpose of improving it; the university is responsible for nothing less than the future course of evolution.

1) The Knowledge Trap

Ironically, the knowledge explosion itself is a potential bottleneck or barrier to postcivilization. On the one hand, teaching is an unproductive craft industry. On the other hand, as knowledge increases, the burden of knowledge dissemination increases from one generation to the next. Too, in American society, taxation or taxation for education may have filled its niche. Additional questions may be asked. What knowledges should we be producing that we are not producing? What knowledges should we be disseminating that we are not? What false or unimportant knowledges are we producing or disseminating? Knowledge production and dissemination,

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then, has definite economic costs, yet advancement of the knowledge industry is crucial to economic development.

Accordingly, in the United States at least, it appears that the solution to this educational difficulty does not lie with teachers and educators but with the larger society. Boulding University would invent new social technologies and educate the American public as to the inadequacies and dangers of educational efficiency. For example, Boulding advocates the expansion of the American government's public deferred exchange economy so as to assist and encourage post-secondary education. (This is based on the educational financing proposal of Charles Killingsworth.) Boulding University professors would study educational questions such as the following: 1) For a given society, for each society in our world, what is the nature and structure of its formal and informal educational system (families, factories, schools, etc.)? 2) What amount of each society's resources are devoted to knowledge production (research) and to knowledge dissemination? 3) Which intellectual resources are underutilized? For example, consider such issues as: blocks to learning; more or less useful knowledges; identification of redundancies in our knowledges; needed interdisciplinary networks. 4) Is research researching the right things? For example, we seem to be devoting our intellectual resources to the

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study of war and peace by advancing the physical and biological sciences instead of the social sciences (e.g., conflict management). For example, agricultural economics seems to be overstudied and educational economics understudied. For example, the academic disciplines appear to be out of touch with the "real" world of human problems. Study of the misallocation of intellectual resources is in order.

Isolated disciplines are able to sustain self-justifying images as if they were truths. A proper restructuring of the disciplines would guard against self-fulfilling prophecies and promote an interest in the solving of human problems. The educational system should see the virtue of knowledge specialization, on the one hand, and the dangers of the fragmentation of knowledge, on the other. Lack of interdisciplinary or integrative perspectives is the equivalent of negative research or lost knowledge. With human survival and betterment in mind, what knowledges are more important or less so? What knowledges are easy or difficult to produce or disseminate? What knowledges are both important and easy to produce or disseminate? How might a society or its educational system be restructured so as to provide the proper payoffs for the indicated restructuring of knowledge increase? Some knowledges or images are being

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widely researched or disseminated to the near exclusion of others.

The structure of perceived payoffs and vested interests in our educational system and our social system teaches us some things and not others. In the midst of realities like the global village and nuclear missiles, our lack of social science and conflict management knowledge production and dissemination threatens human survival and betterment. Boulding suggests that we study the size, structure, and functioning of the knowledge production and knowledge dissemination sectors of our educational system. Then we would proceed to re-orient our educational system and social system toward human survival and betterment. These kinds of studies should be applied to many cultures and educational systems, even to the sociosphere as a whole.

Boulding University and its faculty would engage in teaching, research, and service (educating the public; political action) for the purpose of overcoming the barriers to postcivilization (survival and betterment of the human species). We have already discussed 1) the "knowledge" trap. We will now proceed to discuss 2) the "learning" trap; 3) the "war" trap; 4) the "economic" trap; 5) the "environmental" trap; and , 6) the "globalization" trap.

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2) The Learning Trap

The structure of our social system (and educational system) teaches us certain things but not others. For example, it teaches us patterns of learning. We may learn that we are stupid or that school learning is irrelevant. We may learn that our own nation-state is the greatest. We may learn that life is a struggle against evil and that we should fight to win. Research is needed to develop a theory of learning, with emphasis on the learning of moral identity. If we act like an ass, the reason may be internal, external, or both; how do we restructure our self or our sociosphere so as to transform Boulding's unhealthy ass into Buridan's healthy ass? That is, in the global village, how does one unlearn patterns of going from bad to worse, and learn patterns of going from bad to better? This issue is also discussed in the section above entitled "The Learning Mission of Boulding University"; also see Chapter 3 ("Boulding On Learning").

Eiconic research and development would be aimed at promoting learning/unlearning--and discouraging identity damage, overlearning, lack of learning/unlearning, trained incapacity, and mislearning. On the one hand, we want the learner to identify with every member of the human species, and, on the other hand, to critically test the complexities of reality.

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One may characterize normative science (the scientific study of values and value systems) as one major branch of the science of eiconics. Normative science may use an eiconic model to study a value image, including the image's internal consistency, overall coherence, survival value, stability/instability, organizing/coordinating/integrative power, and so on. Moreover, one may identify the scientific model with such value-elements as truth-telling (not power or politeness), successful abstraction of hidden relationships, mathematics and statistics, experimentation and toleration of mistakes, instrumentation, this/outside world (not subjective peace or another world), feedback and testing (not kneel-down or authority), and so on.

Boulding's eiconic image says no to relativism and yes to pluralism (respect for the inward teachers, no matter how mistaken). The eiconic image suggests stereo vision for human survival. There is an advantage to having many models of reality and an eclectic mentality. Both-and rather than nothing-but.

The study of identity damage and of related integrative, organizing, and legitimizing processes is needed. How does a person learn to be self-conscious and then socially self-conscious? How does one learn to act on the long-term image rather than on the short-run image? By what processes does one develop an image of

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the future? How does one develop a flexible but firm, an optimistic but realistic, worldview? How does one decide when to genuinely communicate and when to engage in hypocrisy? How does one learn to integrate or coordinate one's various values?

3) The War Trap

One is tempted to expand this ("war") category of Boulding's into what might be called the "technology" trap. Science-based technology has given us both goods and bads. How to control this technology (e.g., nuclear missiles) before it destroys our species is a puzzle. Yet advancement of technology seems required for human survival and betterment. (The technology trap would seem to be considerably more difficult to avoid than its subset, the war trap.)

Boulding University would obviously train conflict management and peace researchers, teachers, and educators on an ongoing basis. In the global village, can global disaster be prevented for long? Boulding's book, Stable Peace, would seem to be part of the solution. We need to establish a world organization or network for the policing of disarmament. The details are both all-important and not-obvious. Likewise in the case of how to transform the world's military-academic-industrial complex into postcivilized civilian uses. Obviously the present nation-state system needs to be transformed into

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a more integrative system. Might threat be used "integratively" to modify or replace the existing system?

Once a postcivilized world at stable peace has been achieved, we may wonder why so many considered it impossible. On the other hand, a global village of nuclear missiles suggests rather strongly that we must learn to be more realistic about this issue. One hopes that the learning path to postcivilization, over the next century or two, involves foresight and community rather than war and nuclear missiles. If we are to transform international knowledge from literary images into scientific (or literary-scientific) images, then let us do science! Boulding suggests three steps: 1) Develop a theory of stable peace; 2) Develop a theory of international reality-testing; and, 3) Develop a realistic international information system (i.e., the proper machinery to actually provide quality feedback and statistics about the international system).

4) The Economic Trap

Differential development has produced a widening gap between rich and poor, both within and among nation-states. The advancement of biological-health knowledge and of agricultural knowledge has produced a population explosion in the poor countries. This makes the poor even poorer. Yet wealth is a necessary key to many other

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moral-social goods. Research and development aimed at world economic development of all is urgently needed.

5) The Environmental Trap

In the global village, pollution gives us the joint production of goods and bads. Research and development toward achieving a high level of technology which is environmentally sustainable, long term, appears to be in order.

6) The Globalization Trap

The "shrinkage" of the world into a global village is itself a potential barrier to postcivilization. If one thing goes wrong, everything can go wrong. The answer to the globalization trap is neither anarchy nor tyranny, but integration and the coordination of values. Any system not engaged in the process of integrative learning (including eclectic problem-solving), and any society not engaged, in a disciplined way, in interdisciplinary studies, is courting disaster. This issue is also discussed in Chapter 2 ("Boulding's Philosophy").

We need more research and teaching aimed at the production and dissemination of ecodynamic (i.e., evolutionary and problem-solving) social science. Not social studies (literary knowledge), not social sciences (plural), but social science and even the right kind of

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social science (ecodynamics) is required. The ecodynamic perspective is neither a conflict/revolution model nor a functional/equilibrium model, but an evolutionary systems image encompassing evolutionary disequilibrium and ecological succession. Ecological succession from prebiology to biology to postbiology has apparently led, in the postbiology realm (i.e., the sociosphere), to an ecological succession from precivilization to civilization to postcivilization--but a happy ending is not guaranteed or your money back.

Beyond the general advancement of integrative social science and of related eclectic studies aimed at human survival and betterment, many other, more specific, projects come to mind. We need to establish a global network of social weather stations in an effort to develop a system of social information collection and interpretation. Knowledge of the value systems (and their interactions) of other cultures (as well as our own) is needed if we seek human survival and betterment. It may be that the greatest threat is our unwillingness to apply science (reality-testing) to our images of social, economic, and political systems. Boulding University professors seek social statistics and models of the sociosphere, but due to lack of knowledge we may often have to make do with identification of general structural changes.

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A self-fulfilling prophecy or image--if we are not aware that it is self-justifying--is a barrier to learning. On the other hand, a consciously constructed self-fulfilling prophecy, such as a house or a thermostat, gives us control over the future. Such social thermostats may prevent economic depressions or international wars. Properly designed social thermostats may guard against the dangers of lies, mechanical models of history alleging high predictability, and self-justifying images.

An ecodynamic reconstruction of the history of the sociosphere is in order. A study of the impact of knowledge (i.e., image) dissemination on the total sociosphere would be useful. Also useful would be study, at the whole-society and sociosphere levels, of what Boulding calls "symbolic epidemics" (the spread of religions, philosophies, ideologies, and other symbolic images). Classification of knowledge production and of knowledge dissemination, with an eye on the future, according to what is easy or difficult, important or unimportant, and both easy and important, is an exercise which would promote human betterment. Likewise, study of the future of the relationship between superculture and local culture. And let us ask what knowledge is needed to advance knowledge toward human betterment and beyond knowledge-explosion bottlenecks, economic retrenchment,

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and social-educational blocks. (The knowledge industry is involved in moving toward perceived payoffs; rewards-punishments are structured, for example, by government, business, vested interests, and their images.) The scientific study of the structure, social processes, and evolution of science would be a worthy project.

How do we make the twenty-first century and beyond a better place for all? How may the sociosphere evolve so as to encourage realistic and complex images, and discourage unrealistic and simple images? What might a social system do to encourage stereo vision, multiple models of reality, an eclectic and problem-solving mentality, the integration and coordination of values, respect for one's own and all others' images or inward teachers, and an evolutionary systems perspective? Boulding identifies some characteristics of a social system skilled at human betterment: 1) genuine dialogue; 2) expertise or competence; 3) feedbacks or reality-testing; 4) mutual or interdisciplinary information channels; 5) benevolent-producing rather than coercion-producing decisions and processes.

If the sociosphere dominates the biosphere, then a postcivilized noosphere will dominate the sociosphere and the biosphere. May we consciously construct a sociosphere-wide public image? A widespread global

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public image (or sub-image) would permit widespread coordination of values in the global village.

According to Boulding, learning and macrolearning, more than anything else, depends on the image of the future. What image of the future is most worth having? A Boulding-informed answer, at least, would suggest that we need an image which is optimistic (not pessimistic), realistic (not unrealistic), farsighted (not short-run), integrative (not fragmenting), and creatively flexible and eclectic (not overly firm or totalizing). As we consciously develop an image of the future for widespread dissemination, we will want to attempt to show that some achievable combination of things is better than the existing combination of things. It seems that Boulding's future image of the total earth is that of an (artificial physical-biological-societal) global environment which will encourage learning and nourish dreaming.

Toward a Core Curriculum

What curriculum, then, is needed to promote human survival and betterment, and to transform today's sociosphere into a postcivilized learning society of learning communities of learning persons? Boulding says that it is healthy and realistic for us to be confused as to the proper content of a liberal or core or basic or general education for all. Regardless of what may be

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stated below, there are two educational dangers we will want to avoid. We do not want to fall into the traps of having inflexible blueprints or of causing identity damage in our students.

We should always plan to be flexible and we should always respect each person's inward teacher, no matter how unrealistic or malevolent we may perceive the image to be. Accordingly, we will want to teach our students to 1) Be flexible, or sensitive and open to the future; and, 2) Respect the inward teachers of others: This includes a) being sensitive to other persons (not self-centered), and, b) being sensitive to other peoples, cultures, subcultures, indeed the whole diverse world. Becoming an educated person means going beyond one's own self, culture, or generation.

In attempting to synthesize all of the above considerations into a coherent core curriculum, two images stand out: the image of betterment or learning ("The Learning Image"); and, the image of total earth ("The Global Image"). Accordingly, the following Boulding-inspired outline for a core curriculum comes to mind:

The Learning Image

A) Some skills to learn with

B) How persons learn

C) How societies macrolearn

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The Global Image

D) Interdisciplinary history of total earth

E) Some global problems

F) Toward a better future

A) Some skills to learn with. 1) Learn to integrate living and learning throughout your lifetime. 2) Learn reading and literacy. 3) Learn writing and communication. 4) Learn arithmetic and mathematics. 5) Learn to place basics, facts, vocabularies, and concepts in their meaningful contexts. 6) Learn to use "the learning image" and "the global image" to help you learn contextually. 7) Learn orders of magnitude, not isolated facts. 8) Learn how to independently search, quest, and look things up. 9) Learn to distrust personal experience; the universe is vast and varied. 10) Learn to be flexible in planning for the unknown future. 11) Learn to be sensitive toward all persons and peoples.

B) How persons learn. Eiconic perspectives (The Image) would be presented, with a caution that there is much we have yet to learn about learning. (Also see Chapter 3, "Boulding On Learning," of the present study.)

C) How societies macrolearn. Ecodynamic perspectives (Ecodynamics) would be presented, with a caution that there is much we have yet to learn about the evolution of societies. (Also see Chapter 2, "Boulding's Philosophy," of the present study.)

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D) Interdisciplinary history of total earth. In addition to studying the diversity of cultures/subcultures throughout history, also present the notions of evolutionary thresholds and ecological successions. Just as there was ecological succession from biosphere to sociosphere, it now appears that the sociosphere is in the process of evolving from civilization to postcivilization.

E) Some global problems. Examples include the following: 1) the knowledge trap; 2) the learning trap; 3) the war trap; 4) the economic trap; 5) the environmental trap; and, 6) the globalization trap. (See the section above entitled "The Macrolearning Mission of Boulding University.")

F) Toward a better future. Thinking, research, education, political action, benevolence, and conflict management are called for.

In American society there should be, in Boulding's view, a (flexible) basic education or core curriculum (of sorts) for all children of elementary and secondary school age. This general core curriculum or general education approach would also be required for all undergraduate students at Boulding University. The core curriculum is of course only part, not all, of the curriculum required to receive one's diploma or degree. We have previously suggested the vital "necessity" of

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"frills" and not just "basics" if we are to produce professors and students and persons who are of high intellectual and moral quality.

If schooling has not taught the student lifelong learning, then the schooling is a failure, no matter what else the student may have learned. The basic focus is on total development, not on particular performances or behaviors. According to Boulding, the contents of existing texts (presumably excluding Ecodynamics and The Image!) at the undergraduate, secondary, and elementary levels are generally unsatisfactory. Public schooling should attempt to help students go beyond ethnocentrism by teaching a core "total earth" curriculum. The educational system should help students seek resolution or management of their personal and political problems and questions. We want to promote the values of self-consciousness, social self-consciousness, and responsibility-sensitivity even when they conflict with self-interest, religion, or nation-state. According to Boulding's philosophy there is no such thing as indoctrination-free or value-free learning, and the values we wish to encourage include independence and curiosity.

On the other hand, pure curiosity is dangerous. It is a tentative system of coordinated values, not one absolute value, which will engender human betterment. We

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will attempt to teach students to realistically discriminate good from bad, rather than discriminate based on class, sex, race, or occupation. Yet ultimately we will not be teaching "factually," but "dialogically" or by hypothesis. Education means revision, not dogma.

One function of liberal education is to introduce students to "gateway" learnings. Otherwise there will be whole fields of inquiry and knowledge which will remain unseen and inaccessible. We want to enhance the odds that our students will live useful, creative, happy lives over the next half century or so. Since our image of the future is imperfect, we will want to teach our students the basics involved in learning to learn (rather than the teaching of many details). The basics, as we know, are "the three Rs." Reading and literacy, writing and communication, and, arithmetic and mathematics are basic.

Teach from the perspective of "total earth," rather than from some narrower perspective (such as that of the western world or of a single nation-state). In the nuclear age and the epoch of the global village, a realistic and complex image of the "total earth" must be taught. We need to unlearn unrealistic and simple images such as "good versus evil" and "my nation-state is the greatest." If we are to function as autonomous and responsible persons in our time, certain "total earth" learnings are needed by all.

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Boulding wants us all to learn the importance of the dynamics of whole systems. If we can get a sense as to how the whole system operates, then we can function in a realistic and foresighted manner so as to produce human betterment. Alternatively, we can realistically change the system itself, again so as to produce human betterment. Both these approaches require learning--a realistic understanding of the dynamics of general systems. Otherwise, everyone may act for the best, only to see things get worse.

Especially in this nuclear age of the global village, we want to produce relationships among persons and peoples which are win-win rather than win-lose or even lose-lose. This requires both a will to reality testing and a will to human betterment. Our image of facts and our image of values should continuously modify each other. Even more interesting than where we are, is where we might be in the future. The purpose of education is to get us from where we are to where we are not.

Recommendations for Future Research

1. A philosophic analysis of the terms used by Boulding--either generally or with reference to education--would be useful. For example, Boulding at times tends to equate learning with evolution; by

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evolution/learning Boulding apparently sometimes means variation-selection, sometimes complexification, sometimes simplification-complexification, sometimes order (rather than chaos), sometimes image modification. Boulding uses the term "image" in a wide variety of ways. And Boulding apparently believes there is a difference between the use of "signs" by animals and "symbols" by humans, yet he seems unsure what that distinction is--supplying us with differing accounts (of the supposed difference) from one discourse or work or article to another. Boulding's notion of "knowledge" also needs to be examined (Boulding says that it is knowledge which evolves): Sheer structure, biogenetic know-how, and human learning all fall under this general notion, according to Boulding.

2. Designing alternative images of postcivilization or of a postcivilized sociosphere would be a worthwhile and creative endeavor. By emphasizing Boulding's notion of "the empty niche," researchers would then plot alternative paths from the present to each alternative image of postcivilization. Indeed, researchers should invent ways to fruitfully engage Boulding's notion of the empty niche.

3. Study how the "best," the "average," and the "worst" teachers of the "best," the "average," and the "worst" students would concretely implement (in the

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elementary, secondary, or college undergraduate classroom) Boulding's philosophy or core curriculum as rationally reconstructed above. Compare and contrast the results.

4. Based on an integration of Boulding's philosophy with existing empirical studies, develop a strategy or set of strategies for managing interpersonal conflicts and creating win-win decision-making processes.

5. Much research worth implementing is suggested by Boulding himself: See, for example, the previous sections above on the learning and macrolearning missions of Boulding University.

An Epilogue to the Story?

> Les utopies apparaissent comme bien plus réalisables qu'on ne le croyait autrefois. Et nous nous trouvons actuellement devant une question bien autrement angoissante: Comment éviter leur réalisation définitive? . . . Les utopies sont réalisables. La vie marche vers les utopies. Et peut-être un siècle nouveau commence-t-il, un siècle où les intellectuels et al classe cultivée rêveront aux moyens d'éviter les utopies et de retourner à une société non utopique, moins "parfaite" et plus libre.[1]
>
> --Nicolas Berdiaeff

> I am not here to argue that the human species ought to take responsibility for evolution on the planet, and begin through public and private institutions to make collective decisions about such matters. If that were the question to be decided I would advocate that we put it off for a few centuries or more--let things run themselves while we get accustomed to the idea of evolutionary governance, develop the appropriate ethics and myths and political structures, and perhaps mature a bit. However, that is not the question before us, since we are already governing evolution. This is the great paradox about

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> the threshold: It is not out there ahead of us somewhere, a line from which we might conceivably draw back. We are well across it.
> . . . . . .
> The existential philosophers . . . used to lament that humanity lacked an essential purpose . . . We find now that the human predicament is not quite so devoid of inherent purpose after all. To be caretakers of a planet, custodians of all its life forms and shapers of its (and our own) future is certainly purpose enough. It is a challenge furthermore, with all the trappings of high adventure. It brings danger and mystery, it calls for cleverness and courage, and it promises great rewards.[2]
>
> --Walter Truett Anderson

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NOTES

1. This quote is taken from the epigraph page (facing the copyright page) of Aldous Huxley, Brave New World (New York: Harper & Row, Publishers, 1946). Copyright 1932, 1946. With a foreword for this edition by Aldous Huxley.

2. These (two) combined quotes are taken (respectively) from pages 3 and 10 of Walter Truett Anderson, To Govern Evolution (Boston: Harcourt Brace Jovanovich, 1987).

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APPENDIX

EXAMINATION OF THE DISCOURSE-UNITS

In examining each of the 137 discourse-units, the constraints of the present investigation will be observed; this may result in unfairness to both Boulding and his critics. The investigation has not focused on Boulding the religious believer or even on Boulding the academic, but on Boulding the social-educational philosopher. Boulding the social-educational philosopher is not Boulding the whole person. A study of only two of his books (Ecodynamics and The Image) plus a tiny fraction of his numerous articles, presumably yields an incomplete picture of one dimension of Boulding the academic. It may also yield a more consistent pattern than would a study of the total academic or, further, the complete person. For example, few or none of Boulding's numerous religious publications were considered--"few or none," depending on how one defines "religious publication." Moreover the 1981, but not the 1978, version of Boulding's Ecodynamics was scrutinized. Many of his critics wrote prior to the appearance of the first (1978) edition of his Ecodynamics; even more of the critics wrote prior to the appearance of the 1981

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edition. Accordingly, the Boulding being examined by the critics is not necessarily the same Boulding herein constructed. The Boulding herein constructed is certainly less than the "real" Boulding. In order to be true to the Boulding herein constructed or emerging, and to the purpose of the present study--unfairness to both Boulding and his critics seems likely. At the same time, Boulding the emerging social-educational philosopher--hereinafter referred to as Boulding The Philosopher--seems a project worthy of construction, perhaps yielding insights which will occupy social, philosophical, and educational niches otherwise empty. The following examination of Boulding The Philosopher and his critics, then, is offered with apologies to both Boulding and his critics--but with constructive ecodynamic intent. Do the allegations of the critics hold up or survive in terms of identifying false or questionable or inconsistent claims (i.e., nontrivial or significant written claims) by Boulding The Philosopher, given the constraints of the present study?

David P. Barash as Critic

Examination of Discourse-Unit #1

Barash points out that humans have 46 (not 48) chromosomes. In (the 1981 version of) Ecodynamics,

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Boulding agrees with Barash (46, not 48, chromosomes), thus revising a previous mistake of his.

Examination of Discourse-Unit #2

Barash claims that the author of Ecodynamics believes in a "one chromosome, one ancestor" hypothesis. A closer reading of Ecodynamics (1981) reveals that what Boulding actually believes, instead, is that a given human has 46 ancestors at most; according to Boulding this is a deductively valid inference based on the standard scientific model of human heredity.

Examination of Discourse-Unit #3

Barash claims that the author of Ecodynamics believes that current evolution of an organism must necessarily be more complex than previous evolution. But in fact Boulding holds no such belief; Boulding actually believes, instead, that there is some overall tendency toward complexification (e.g., his notion that there is "room at the top"), not that complexification is inevitable in the short run.

Examination of Discourse-Unit #4

Boulding claims that selection is more important than mutation/variation in evolution. What Boulding apparently means when he asserts this is: 1) For any given system in any real space-time, there are only a finite (not infinite) number of feasible

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mutations/variations which are possible; and, 2) Which mutations/variations actually occur (i.e., are selected) help set the parameters for the next state of the system (again, this will be a system with only a finite number of mutations/variations possible).

Examination of Discourse-Unit #5

Barash claims that Boulding always thinks in terms of populations rather than individuals. In fact, Boulding cautions us against forgetting about individuals. But Boulding points out the importance of developing abstract, simplifying distinctions if one is to make progress in the advancement of theoretical models or scientific insight. Moreover, some populations (e.g., some insects) act more like individuals than do the individuals which make up the population--at least as viewed from the ecosystem perspective.

Examination of Discourse-Unit #6

Barash claims that the author of Ecodynamics models his system on survival, rather than on reproductive success, of a population. But one should remember than Boulding's theory is meant to cover not only the biological, but also the prebiological and societal realms as well. When appropriate, Boulding does indeed discuss reproductive success, but he sees survival or a population's niche as the more general notion.

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Whether Boulding places too much emphasis on catastrophes is a question over which evolutionary scientists disagree. Barash is less friendly to Boulding here than is 1993 knowledge.

Examination of Discourse-Unit #7

Boulding's notion of territoriality may be unclear or questionable to at least some readers. Moreover, Boulding's claim that it is possible for a species to sexually breed itself into extinction is questionable to at least some evolutionary biologists.

Examination of Discourse-Unit #8

Presumably Boulding would agree that a simplified account of his simplified discussion of benevolence/malevolence is an oversimplification. Boulding does indeed see perceived benevolence/malevolence and perceived payoffs as a better explanation of behavior than mere benevolence/malevolence.

Examination of Discourse-Unit #9

At times Boulding does indeed appear to treat societal evolution and biological evolution as independent realms. This is, however, a simplifying device to assist clear explanation. Boulding points out that in reality all three realms (physical, biological, and societal) interact in a highly complex manner.

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Boulding says that there are both similarities and differences between the biological and societal processes of evolution.

On the one hand, Boulding says we know relatively little in detail about the relation of the human genotype to its phenotype. On the other hand, Boulding says that in general it appears that a human brain has great potential for flexibility and learning; there are a wide variety of human cultures. Sometimes Boulding seems to say that noogenetics dominates biogenetics in humans, other times he appears to say that the human species is now (with the advancement of biological science and genetic engineering) on the verge of this being the case. But certainly one can at least imagine a great gulf between a highly educated human and a feral human, even given that the two are genetically identical.

Joseph S. Berliner as Critic

Examination of Discourse-Unit #10

Whether it would be better to characterize the contents of Ecodynamics as a theory, a paradigm, or a vision is open to question. Philosophers do not agree as to the proper meaning of "theory" or "explanation" or "science." One, but certainly not the only, plausible approach to this issue would be to see "ecodynamics" as one person's interpretation or version of the general

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"theory" of evolution. Boulding has pointed out that evolutionary theory has some explanatory power, but little predictive power.

Paul Bohannan as Critic

Examination of Discourse-Unit #11

Bohannan appears to be saying (?) that Boulding merely describes what in fact happened in the past. Yet Boulding actually offers more, in the form of insights, abstractions, models, and principles. Moreover, Boulding points out that often it is new simplifications which allow the possibility of further evolutionary complications.

Examination of Discourse-Unit #12

If "cultural evolution" is a term used by anthropologists, then another term (e.g., "societal evolution") seems appropriate if Boulding is attempting to offer his own unique perspective. Moreover, Boulding could point out that prehuman animals engage in cultural evolution, or individual learning, but the new evolutionary threshold was reached with humans, which included specifically the evolution of human organizations and the macrolearning of societies.

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Charles August Capone as Critic

Examination of Discourse-Unit #13

Sometimes Boulding uses the analogy of the earth as a spaceship or a pond. The deeper image of the "total earth" which Boulding means to provide, however, is that of an ecosystem with three interacting realms (physical, biological, societal).

Examination of Discourse-Unit #14

One can claim both that there is one way, and many roads, to the good society. Each road, of course, would have to participate in the one way. On the one hand, Boulding believes that this one way requires a strong emphasis on reality-testing. On the other hand, Boulding believes that the only unpardonable sin is to despair. Boulding believes humans have great potential for learning; this is another way of saying that there is much humans have not yet learned which they need to learn. Boulding The Philosopher ascribes neither to a God-denying humanism nor to a God-affirming humanism--but to an agnostic or open-minded humanism.

Examination of Discourse-Unit #15

Boulding The Philosopher does not see humans as mere units, but as sacred entities with a complex image and capable of great learning. Boulding The Philosopher does not see society as deterministic, but as an ecosystem of

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interacting (not stimulus-response) populations and individuals. Boulding discusses the need for the right social systems along with, not separate from or predominant over, personal characteristics. Boulding does not dismiss the importance of morals nor does he allow for the possibility of any economic-political form of organization in the good society. Boulding believes we should humbly strive toward the good and that it is dangerous to believe that we have already arrived at absolute Truth. The love, heroism, and hunger for the Divine (which Boulding ascribes to humans) has played, and will continue to play, an important role in societal evolution, according to Boulding.

Examination of Discourse-Unit #16

According to Boulding, the advancement of knowledge may permit greater good, greater evil, or both. On the other hand, without learning or macrolearning or both, a society will not advance toward the good. Boulding believes that all three factors (threat, exchange, integration), rather than only one or two, are needed for a good society. A good society will want to advance some knowledges, and not others.

Examination of Discourse-Unit #17

Hope of reaching a good or better society is obviously more than a mere dream in Boulding's

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philosophy; Boulding shows why virtues like love, repentance, humility, or meekness are important if we are to successfully, realistically achieve the great transition to postcivilization.

Examination of Discourse-Unit #18

Boulding believes that the quest for utopia--whether in this world, or whether in order to forget this world--can be dangerous. Despair also is dangerous. A responsible person attempts to steer a realistic middle course so as to help achieve human betterment.

Earl Cook as Critic

Examination of Discourse-Unit #19

Boulding identifies some (but perhaps not all) principles of mutation/variation. We can think in terms of such notions as catastrophes, rare events, random events, redundancies, empty niches, the opening and closing of niches, "room at the top," "the long-term probability of improbability," and "the four Rs," for instance. Scientists do not agree as to how best to characterize the principles of variation or evaluate their relative importance. However, if one is interested in what might have been or what may yet be, as distinguished from solely what in fact was, Boulding's notion of "the empty niche" would seem to be of relevance.

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Gray Cox as Critic

Examination of Discourse-Unit #20

While the dreaming up of utopias may serve a vital, creative function, Boulding thinks that at times it can get in the way of feasible action for human betterment. "A bird in the hand is worth two in the bush." We should seek an end both to structural violence and to war. However, conflict management (the abolition of war) is more feasible and necessary in the relative short run, according to Boulding. A world at stable peace can then continue its quest against structural violence and for human betterment. Boulding is more interested in making the great transition to postcivilization than in defining absolutely the one correct meaning of "peace" or of "utopia."

Herman E. Daly as Critic

Examination of Discourse-Unit #21

Daly claims that the 1949 Boulding is more correct than Boulding the author of Ecodynamics: It is the capital stock from which we derive satisfactions, not from the additions to it (production) or the subtractions from it (consumption). This is a question over which economists disagree.

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Philip Edward Deberardinis as Critic

Examination of Discourse-Unit #22

Deberardinis claims that Boulding tends to overlook personal and group self-interests in his quest for human betterment. At times Boulding gives the appearance of erring in this way. At other times, however, Boulding shows us the shortcomings of narrow self-interests, and points us toward learning and macrolearning as the solutions.

Examination of Discourse-Unit #23

Boulding's model of war and peace does not claim to match in detail the complexity of the real world. It is meant to be a simple abstraction for the purpose of providing some insight into the real world and a foundation for future, more complex, models.

Examination of Discourse-Unit #24

Deberardinis claims that Boulding's policy suggestions for achieving a stable world peace may not be entirely feasible--for example, the proposal to take national boundary questions off the international agenda. One plausible interpretation of Boulding, however, is simply that we should be working toward realistic goals, of which this is one.

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Examination of Discourse-Unit #25

Deberardinis claims that the GRIT proposal is untested. If this proposal by Charles Osgood is the best we can presently come up with as an alternative to war/deterrence on the one hand and surrender/disarmament on the other, then we should be on our way to testing GRIT, one of whose virtues is that prudential testing of this proposal is feasible.

Examination of Discourse-Unit #26

Deberardinis claims that Boulding overestimates the promise of a national peace policy. This claim is difficult to evaluate, but notice that Deberardinis is not arguing against the proposal.

Examination of Discourse-Unit #27

Turning military forces into U.N. or quasi-U.N. peace-keeping forces may be more feasible today than during the Cold War period; this would appear to be a realistic goal toward which we should be working.

Examination of Discourse-Unit #28

Setting up a U.N. or quasi-U.N. Spying Organization may be more feasible today than during the Cold War period; this would appear to be a realistic goal toward which we should be working.

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Examination of Discourse-Unit #29

If NGOs are of positive importance for world peace, then it would seem desirable that persons and organizations become aware of this and that nation-states consciously formulate their policy for world peace accordingly.

Examination of Discourse-Unit #30

When speaking in general systems terms, Boulding may mean to be talking about systems of many different sizes. At other times Boulding points out that all systems are not the same. For example, Boulding points out that treating nation-states as if they were individual human persons is a simplified way of speaking which can become misleading.

Examination of Discourse-Unit #31

The importance of peace research is substantiated by Boulding. Just as we can scientifically study the physical and biological realms, we can also scientifically study the societal realm of human persons and organizations. Despite the importance of war-prevention in a nuclear age, we prefer to hold on to our old literary images of the international system. We prefer to expend great resources on war and war-prevention by advancing the physical and biological sciences. In the absence of peace research, our science

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and technology is seriously imbalanced. The development or learning of new social inventions is needed.

Examination of Discourse-Unit #32

Boulding's strain-strength model of war and peace is meant to be an imperfect or simplified first step in developing a more complex and detailed model.

Hazel Henderson as Critic

Examination of Discourse-Unit #33

If one is speaking in general systems terms, then it seems reasonable to count automobiles, as well as horses, as species. On the other hand, biological and societal species differ. Moreover, within the biological realm of biological species, for example, horses and hyenas differ. Production in the biosphere and the sociosphere differ substantially, despite the fact that in each case the three factors (means) of production are knowledge, energy, and materials.

Examination of Discourse-Unit #34

Whether Boulding's threat-exchange-integration model favors exchange too much is a question. After all, Boulding is an economist. On the other hand, integration is more important in Boulding's model than exchange or threat.

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Examination of Discourse-Unit #35

Boulding both does and does not "downgrade" the family as a basic organizer of human society. Some prehumans have families, but no prehumans have churches, universities, or nation-states. In the absence of organizations (i.e., post-family structures), cultural evolution may have stagnated. On the other hand, Boulding recognizes the primal importance of the family in establishing a foundation of identity; for example, a culture of child abuse or of child love tends to reproduce itself.

Examination of Discourse-Unit #36

Henderson claims that Boulding fails to articulate the will-to-manipulation on the part of powerful males and the experience of entropy on the part of others, especially women. According to Henderson, women and manual workers "cannot communicate their knowledge to the predominantly male executives and leaders, not to mention their intellectual courtiers and apologists." On the other hand, Boulding does point out that the wealthy, but not the poor, tend to have access to knowledge and capital. Boulding also speaks of differential development based on scientific knowledge.

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Examination of Discourse-Unit #37

Henderson claims that Boulding fails to spell out all the attendant social costs of the pathological aspects of specialization and division of labor. While Boulding sees specialization as necessary to the development of civilization, he also points out (some, but perhaps not all) its dangers if we seek an integrated personality or world.

Examination of Discourse-Unit #38

Boulding tends to see oppression as a minor, rather than major, problem. Differential development, based in scientific knowledge, is a major factor which explains the growing gap between rich and poor, according to Boulding.

Examination of Discourse-Unit #39

Boulding believes that hierarchy should not be ignored as an explanatory principle.

Eugenia C. Hunter as Critic

Examination of Discourse-Unit #40

Some of Boulding's various models do indeed assume that behavior units act so as to rationally maximize their behavior. In such cases the model is meant to be simplistic, a first step toward a more complex model.

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Examination of Discourse-Unit #41

Boulding's model of war and peace assumes only two parties to the conflict. This model is meant by Boulding to provide insight and to act as a simplistic first step toward developing a more complex model of conflict.

Examination of Discourse-Unit #42

When inventing and developing a model, Boulding sometimes seems to discuss matters not directly relevant to the model. A closer reading of Boulding, however, will sometimes reveal that such matters are more relevant than perceived in the first reading.

Cynthia Earl Kerman as Critic

Examination of Discourse-Unit #43

Some of Boulding's models lack predictive power and do not explicitly attempt empirical verification. Boulding calls for more data-gathering, but he produces little data himself. Boulding calls on others to collect data, while he steps back to attempt a universal synthesis. If Boulding's ecodynamic philosophy is correct, then any universal model claiming detailed predictive power is bound to be wrong. As a first step in model building, Boulding apparently seeks rationality or logical consistency, informed by enlightened common sense and existing scientific knowledge. A number of

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Boulding's models are explicitly meant to be simplistic first steps.

Examination of Discourse-Unit #44

The philosophy of Boulding generally holds up well against his critics. It is not unusual for Boulding the generalist to be more correct than his specialist critic. When Boulding is wrong, it is typically a relatively minor point with little significance for his social-educational philosophy.

Examination of Discourse-Unit #45

Here the reader is referred back to the section above entitled "Examination of Discourse-Unit #21."

Examination of Discourse-Unit #46

Some of Boulding's models give the appearance of being "hard," some "soft." To what extent models composing the most realistic or ideal social-educational philosophy or theory would be "hard" or "soft" is presently far from obvious.

Examination of Discourse-Unit #47

Boulding seems to have some tendency to see humans as essentially good, but warped by outside constraints--rather than as essentially sinful. It is not immediately obvious as to Boulding's response to the person who consciously decides to do evil. On the other hand,

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Boulding points out that some of the most "evil" persons in history (perhaps including Hitler) were attempting--in an unusually active or conscious way--to do good and create a good society.

Examination of Discourse-Unit #48

Sometimes when Boulding speaks of the need for advancement in social science and of the importance of specifically scientific knowledge, he may come across as antihumanistic. But in fact he believes that the "nonscientific" humanities are also vital to human betterment. Moreover, science (or knowledge generally) may grow in a healthy or in a pathological manner. Knowledge, according to Boulding, should be more oriented toward solving human problems--i.e., human survival and betterment.

Much of Boulding's work may come across as of little practical use. This is not true of all his work, however. Moreover, he is an academic, not a practical politician. Too, in many areas he is providing the necessary intellectual groundwork for later research, advancement, and application.

Examination of Discourse-Unit #49

Boulding's notion of a good administrator is not that of one who fits nicely as a cog in a machine or who reveres red tape; rather, an administrator should attempt

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to act with courage, foresight, and enthusiasm.

Examination of Discourse-Unit #50

If the ideal person combines idealism with realism, is Boulding too romantic? Is Boulding unrealistic in his disbelief in "original sin"? The answers to these questions are open to dispute. (This discourse-unit is related to discourse-unit #47.)

Examination of Discourse-Unit #51

Although Boulding, like the rest of us, has been known to laugh at others' ideas, he prefers to respect each person's inward teacher or worldview, no matter how flawed. The classroom teacher should attempt to guide the student's inward teacher so as to enjoy learning to learn (i.e., enjoy learning to modify one's worldview) on a lifelong basis.

Examination of Discourse-Unit #52

This critical discourse-unit is tantamount to (attempted) psychoanalysis of Boulding; no false or questionable or inconsistent claims in the writings of Boulding are alleged.

Examination of Discourse-Unit #53

This poem by Boulding seems to claim that Boulding seeks the interesting rather than the true. The reader should note, however, the following possibility: Some

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things untrue are interesting to Boulding; all things true are interesting to Boulding; classifying a thing as true or untrue is interesting to Boulding.

Examination of Discourse-Unit #54

Boulding considers Marxism to be idealistic, which is good, and unrealistic, which is bad. Marxism, he believes, will lead a society into pathologies, such as economic ruin. It is not immediately obvious why Boulding calls Marxism the fourth Judaic religion. Perhaps it is because Judaism believes in a linear, rather than cyclical, history. Perhaps it is because of Marx's quasi-rootedness in Hegel's quasi-Christian philosophy. Perhaps Boulding equates religion with ideology or with a totalizing way of life, rather than with theism.

Examination of Discourse-Unit #55

In this critical discourse-unit, no false or questionable or inconsistent claims in the writings of Boulding are alleged.

Examination of Discourse-Unit #56

Whether Boulding has an unwarranted confidence in his sense of direction is a question open to dispute.

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Ezra Mishan as Critic

Examination of Discourse-Unit #57

Mishan claims that the author of Ecodynamics presents no thesis and produces no coherent interpretation of societal evolution. Mishan, however, fails to adequately support these claims. Although Boulding's ecodynamic philosophy (as presented in Chapter 2 of the present study) may be incomplete and imperfect, it does seem to make a creditable attempt at coherently explaining the course of societal evolution.

Glendon Schubert as Critic

Examination of Discourse-Unit #58

To the extent that this discourse-unit alleges that the author of Ecodynamics makes false or questionable or inconsistent claims, it offers little argumented and evidenced criticism beyond the previous 57 discourse-units.

Examination of Discourse-Unit #59

Boulding does not claim that today we have optimized the use of our brain potential. What he claims, rather, is that today's sociosphere differs considerably from the sociosphere of 50,000 years ago; two genetically identical brains may develop, neither one optimally, into differing structures. Apparently (?) Boulding finds it

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difficult to imagine what it would have actually felt like to personally exist in the sociosphere of 50,000 years ago.

Although Boulding speculates about hominid evolution, Boulding readily admits (on page 112 of Ecodynamics) that this is speculation of his part. Boulding admits that he does not know how the growth of the hominid brain over millions of years in fact conferred survival. His point is that whatever the factual reasons for this evolutionary development may be, the human brain is a very redundant organ which a short-sighted efficiency expert would have considered rejecting. The hominid brain evolved and survived in the absence of Beethoven's Ninth Symphony--yet nevertheless the human brain has the capacity for producing such wonderful "excesses." Much of the human brain is hidden or recessive and has never become manifest due to lack of a sufficiently evolved sociosphere. Boulding is claiming that one of the principles of evolution is what he calls "joint genetic production": Biological genes act in an interactive way with each other and the environment. (Apparently discourse-unit #59 does not choose to disagree with Boulding on this point.)

Examination of Discourse-Unit #60

Boulding's actual position is that reinforcement simply strengthens our worldview, whereas disappointment

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causes us to question it, thereby encouraging the possibility of a more profound process of learning. Boulding is not beyond using words to make it appear that he is contradicting himself when actually he is not; some readers will thus dismiss Boulding as inconsistent, while other readers will read again for his (often not inconsistent) insights. Too, Boulding emphasizes the importance of perceived payoffs in terms of how they influence our learning/mislearning and behavior/ misbehavior.

Examination of Discourse-Unit #61

Schubert claims that Boulding believes non-human primates do not experience emotions similar to those that humans feel. Boulding's actual position is that many, but not all, emotions experienced by humans are also experienced by other primates.

Examination of Discourse-Unit #62

Schubert, on the question of bird song, is less friendly to Boulding here than is 1993 knowledge. Boulding's real point, however, is that prehuman animals, not just humans, engage in culture or learning. Moreover, Schubert again misunderstands Boulding: With his reference to Lamark, Boulding is stating that there are two "genetic" roads to learning or evolution--biogenetics (genes) and sociogenetics (culture). Genes

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are reproduced and so are cultural/subcultural images. On rare occasions a mutation (whether biogenetic or sociogenetic) will be fit enough to be selected for transmission to future generations.

Examination of Discourse-Unit #63

If (?) Schubert is correct that "there is no precedent for feral lions and tigers to co-exist in a common habitat, during historic time," then it would have been good for Boulding to say so when he used lions and tigers as an example of "mutually competitive equilibrium." On the other hand, the example is meant to be an illustration. One of the explicit points Boulding makes here is that the stability of this equilibrium is somewhat precarous, meaning that there would be a tendency for lions and tigers to live in separate habitats.

Examination of Discourse-Unit #64

Like discourse-units 1 and 2, this discourse-unit also questions Boulding's knowledge of meiosis. Should Boulding's knowledge here prove faulty (?), this would constitute only a relatively minor adjustment in his account of evolution.

Examination of Discourse-Unit #65

Boulding believes that Schubert's parallel is not so simple. Boulding claims that the parallel between

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"biological advantage" in the biosphere and "profit" in (the exchange system of) the sociosphere is rather superficial when compared with their differences. Perhaps Schubert might (?) respond that in each case the synergism gives the organism or firm survival or profit value.

Examination of Discourse-Unit #66

If Boulding's theory of evolution involves not only the biosphere, but the prebiological and societal realms as well, then the term "species" or "taxon" should not be limited to the biological realm. Accordingly, one may properly speak of a biological species, or of a prebiological species, or of a societal species. Horses, hydrogen atoms, and horseless autos are all species in Boulding's taxonomy.

Examination of Discourse-Unit #67

It seems that Boulding may have confused the reader, if not himself (?), with a careless use of the term "sociobiology." Before sociobiologists such as Edward Wilson (for example) came on the scene, it may (?) have been that social biology was sometimes called "sociobiology"; it seems that (with reference to the page cited) Boulding should have used the term "social biologists" instead of "sociobiologists." On the other hand, Boulding believes that sociobiologists in general,

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as well as many individual social biologists, tend to study biogenetics to the exclusion of sociogenetics, thereby giving them (sociobiologists and social biologists) a distorted view of human learning and behavior.

Examination of Discourse-Unit #68

For anyone who takes time to read the entire book (Ecodynamics), Boulding's use of such terms as "prebiological," "prehuman," and "precivilization" seems clear enough.

Boulding's notion of territoriality may be unclear or questionable to at least some readers. Like discourse-unit #7, discourse-unit #68 questions Boulding's knowledge of territoriality. Should Boulding's knowledge here prove faulty (?), this would constitute only a relatively minor adjustment in his account of evolution.

While presumably Boulding would agree with Schubert that for a territorial population, its food supply is normally, or for the most part, to be found on its territory, certain distinctions are possible: Whether or not it ultimately helps Boulding's "argument" (?) here, one can distinguish between the food supply associated with the niche of a species and the food supply associated with the actual territory of the species or of a specific subpopulation of the species; on second

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thought, perhaps the appropriate hypothetical distinction is between two identical or similar species, except one is territorial and the other is not. If Boulding's speculation or argument here is unclear, one of his more important points is that "fighting to the death" (whether the conflict is perceived by humans in terms of territoriality, pecking orders, or sexual selection) is very rare. Signalling, singing, or displaying to the other to stay away is often enough, and fighting, when it occurs, is usually much less ferocious than the "social Darwinists" had imagined. (It seems that "nature" has a tendency, even a strong tendency, to select <u>against</u> those who fight to the death.)

<u>Examination of Discourse-Unit #69</u>

In fact Boulding emphasizes that as a broad generalization, primates (including humans) are unusually conflictual relative to biological species in general. But fighting to the death is very rare, and war is unknown, to prehumans. It should also be pointed out that territoriality means something like "stay away from me/us or my/our space"; this is considerably different from the human concept of real estate or ownership of property, or the human notion of territory as associated with empires or nation-states. Yet even in the case of humans, humans sometimes overemphasize the importance of dramatic conflict and underemphasize the importance of

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everyday, mundane nonconflictual or unviolent processes. If most humans have a relatively poor understanding of how to avoid war, Boulding's understanding may be relatively better.

Examination of Discourse-Unit #70

What Boulding is referring to here are: 1) The very long-run evolutionary process (see the section entitled "Examination of Discourse-Unit #3"); and, 2) The insights provided by the so-called "prisoner's dilemma." Boulding's point is that if humans do not learn/evolve a sense of flexibility and benevolence in time, the human misadaptation may result in human extinction. (Schubert seems to have yet again misinterpreted Boulding.) To the extent that humans survive and advance, it seems that noogenetic (i.e., sociogenetic) processes will become increasingly more important for the course of evolution. What Boulding advocates is not civilization or precivilization, but postcivilization. It appears that the human species will either continue to misadapt and become extinct, or learn and become postcivilized. It is easy to romanticize precivilization, but virtually no precivilized human was concerned with the welfare of the entire human species. Some present humans have learned, and perhaps many future humans will learn, concern for the welfare of the entire human species. Moreover, presumably fewer people believe in laissez-faire

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capitalism and "social Darwinism" at the end of the present century than at its beginning.

Examination of Discourse-Unit #71

While Schubert and Boulding may dispute or not the actual facts surrounding the lives of Henry Ford and of Jesus of Nazareth, Boulding's point here seems clear enough. Sometimes it seems that certain historical sequences would have occurred even if the actual historically key person had been someone else. (Perhaps the course of science and technology tend to be this way.) On the other hand, sometimes it seems that certain historical sequences would not have occurred except for the actual existence of a specific or unique historically key person (e.g., William Shakespeare). (Perhaps the course of religion and philosophy tend to be this way.)

Examination of Discourse-Unit #72

Whether or not Boulding is correct in his belief that in today's global village "the difference between monolingual and multilingual societies is not really very great, and people with common languages are just as prone to go to war with each other as people with different languages," [Ecodynamics, page 132] Schubert's contrary argument fails simply because he omits the logically crucial distinction between monocultural/multicultural and monolingual/multilingual. Boulding's point is that

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the former set of distinctions is more fruitful or has greater explanatory power (with reference to war or conflict) than the latter set of distinctions.

Schubert also fails to make the important (i.e., if one wishes to interpret Boulding correctly) distinction between Protestantism and a quasi-Protestant ethic which tolerates personal differences of religious belief.

Examination of Discourse-Unit #73

In fact, Boulding believes that the good society would contain all three factors--threat, exchange, and integration--not one or two factors. Moreover, Boulding believes that each of the three systems may develop (and historically have developed) pathologies. On the other hand, integration is the most necessary or powerful of the three systems; and the integrative system would be especially important to a postcivilized society. Everything else being equal (which they rarely are), we should prefer exchange to threat, and integration to exchange or threat. Although threat has been very important for the productive growth of civilization, it usually is not very important whether it is X or Y who wins a particular war--from the distant perspective of the long-term course of evolution, or so Boulding maintains. In order to make the great transition to postcivilization, Boulding suggests that we develop philosophies which favor world integrative growth,

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economic development, and conflict management so as to help overcome the pathology of war and the malevolence of philosophies fixated on the winning of fights.

Examination of Discourse-Unit #74

This critical discourse-unit fails to identify any claim by Boulding which is (nontrivially or significantly) false, questionable, or inconsistent.

Examination of Discourse-Unit #75

Here Schubert seems to be creating a dilemma or inconsistency in Boulding's thought where none exists. Boulding wants to create a world at stable peace, on the one hand, and, on the other hand, maintain cultural diversity. Likewise, Schubert misinterpreted Boulding's statement about Germany. A Germany of Nazis is possible even without Hitler, according to Boulding. We need to think not so much in terms of Hitler as in terms of the parameters of an environment encouraging Nazism.

Examination of Discourse-Unit #76

Boulding's point is that in a world of automobiles and telephones, the county unit is a burden or anomaly. Boulding does not claim that this unit should be replaced; and, unlike Schubert, he does not take a position as to whether, in the near future, automobiles will be replaced with something else.

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Examination of Discourse-Unit #77

Marx explicitly created his philosophy so as to assist in transforming his present (nineteenth century) world into a better future world. Accordingly, it is odd that the Marxist model works better in explaining the pre-capitalist past (i.e., the middle ages) than in explaining Marx's present (capitalist) world or beyond. Boulding, unlike Schubert, does not take a position as to whether Marx would be a Marxist if he were living today.

Examination of Discourse-Unit #78

This critical discourse-unit fails to identify any claim by Boulding which is (nontrivially or significantly) false, questionable, or inconsistent.

Examination of Discourse-Unit #79

This critical discourse-unit fails to identify any claim by Boulding which is (nontrivially or significantly) false, questionable, or inconsistent.

Examination of Discourse-Unit #80

Boulding sometimes calls the Soviet Union relatively homogeneous and sometimes he calls it relatively heterogeneous, depending on the context. Boulding indeed successfully "predicted" that a breakup of the relatively heterogeneous Soviet Union was not unlikely. (When referring to the Soviet Union as relatively homogeneous,

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perhaps he meant to be speaking of its threat-enforced conformity.)

Otherwise, discourse-unit #80 fails to identify any claim by Boulding which is (nontrivially or significantly) false, questionable, or inconsistent.

Examination of Discourse-Unit #81

This critical discourse-unit fails to identify any claim by Boulding which is (nontrivially or significantly) false, questionable, or inconsistent.

Examination of Discourse-Unit #82

Sometimes Boulding is ambiguous. On the other hand, sometimes he speaks clearly but in general terms appropriate to a general theory. Schubert--in the absence of speaking more clearly or supplying more evidence to support his contention--appears to be in error in claiming that Boulding's hypothesis about language change is deterministic. (Also see the sections entitled "Examination of Discourse-Unit #43" and "Examination of Discourse-Unit #52.")

Examination of Discourse-Unit #83

This discourse-unit fails to identify any claim by Boulding which is (nontrivially or significantly) false, questionable, or inconsistent.

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Examination of Discourse-Unit #84

Schubert claims that it is unclear what Boulding means by the term "Christianity" when he says that it survived over the centuries. Yet on that very page (352-3) of Ecodynamics, Boulding does in fact tell us what he thinks the term means.

Albert Somit as Critic

Examination of Discourse-Unit #85

Boulding attempts to explore similarities and differences among the three realms (prebiological, biological, and societal). This critical discourse-unit is devoid of details to the point that it fails to identify any claim by Boulding which is (nontrivially or significantly) false, questionable, or inconsistent.

Examination of Discourse-Unit #86

This critical discourse-unit fails to identify any claim by Boulding which is (nontrivially or significantly) false, questionable, or inconsistent.

Examination of Discourse-Unit #87

Somit claims that Boulding believes that he has already produced the grand evolutionary synthesis many have been looking for. What Boulding actually believes is that he has made some not insignificant steps in that

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general direction; much of the jigsaw puzzle remains to be solved.

Judith Peterson Stevens as Critic

Examination of Discourse-Unit #88

Contrary to what Stevens seems to suggest, Boulding coherently believes both that one's image is the basis for one's (attempted) behavior and that reality determines, or helps determine, the results or payoffs of that behavior. Boulding The Philosopher specifically claims an inability to demonstrate the existence of an external reality. But tentative faiths or working hypotheses--e.g., that there is a real world of facts and of values--are necessary if one seeks human betterment.

Examination of Discourse-Unit #89

It seems that Stevens is incorrect here and Boulding is correct: Raw data do not provide us with what we call facts; it is image-interpreted data which gives us our perception of so-called "facts." Further, Boulding's distinction between the conscious and nonconscious dimensions of the image is useful here, and some facts give one the impression of being more "factual" than others.

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Examination of Discourse-Unit #90

Many scientists (and non-scientists!) proceed based on the assumption that humans are structured so as to be able to more or less accurately perceive outside reality. Boulding believes human scientists often find this assumption or faith to be highly useful; usefulness, however, does not guarantee absolute Truth. Belief in the existence of Truth, and in the inability of finite humans to find it absolutely, are two important assumptions of Boulding's philosophy; this allows one to act so as to attempt human betterment, and to so act humbly rather than dogmatically. Since "image," as Boulding uses the term, includes both conscious and nonconscious dimensions, it is not true that for Boulding humans know symbols and nothing else; but symbols are extremely important for Boulding, since good faith dialogue among humans is a key to human betterment. According to Boulding, a human person receives not only messages from symbols, but also messages from nature.

Examination of Discourse-Unit #91

When Boulding suggests that something (say, the influence of Moses and Hitler) is a mystery, this may be his way of saying that a simple model, such as the one he has just constructed, should not be taken too seriously in attempting to explain all of the details and complexities of reality.

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Examination of Discourse-Unit #92

As previously suggested, Stevens is incorrect in claiming that Boulding believes that there is no such thing as truth. Boulding believes, however, that we should be open to the possibility that our image is imperfect; moreover, the image acts as a filter, conscious and nonconscious, which serves as our criteria of so-called "validity." Our conscious and nonconscious criteria of truth change; what the ultimate criteria would be is uncertain. Many human images find it more useful to disbelieve in solipsism than to believe in it. Likewise, many human images find it useful to believe that good faith dialogue may advance human betterment. If all humans belong to the same species, then they may share certain fundamental structures permitting a common task of human betterment. For example, all humans have the ability to imagine that all humans belong to the same species. Since reality (in both facts and values) exists, some images are better or worse than others--hence, again, the importance of good faith dialogue among humans. Many human images value human betterment rather than human extinction. Many human images value realistic feedback over peaceful dogmatism. Although Boulding believes it important to have both literary and scientific knowledge, scientific knowledge in general tends to be more accurate. Accordingly, as a general

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(not absolute) rule, it is desirable that one's literary knowledge not contradict one's scientific knowledge.

Examination of Discourse-Unit #93

Since, according to Boulding, image formation and image modification is so important for the course of evolution, our need to promote eiconic (i.e., human learning) research and development is great.

Examination of Discourse-Unit #94

The notion of education as knowledge increase, or as image formation and image modification, is not vague or imprecise but integrative and realistic. Formal education may then be perceived unambiguously as a subset of education. Many of Boulding's articles deal with education; many deal specifically with formal education.

Examination of Discourse-Unit #95

Boulding does not believe that there is any guarantee of exact transfer of images in teaching. Boulding does emphasize respect for the inward teacher (a person's image or worldview), although the goal is to modify one's inward teacher or worldview. Teachers and students may or may not share knowledge with each other; nevertheless, the sharing of knowledge, unlike the using up of energy, is not subject to the law of entropy. Boulding believes that formal education should be less threatening, and more integrative, than it historically

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has been. Boulding here sometimes seems to want it both ways: wanting the system of formal education to be more integrative, yet seeing the necessity of threat. For Boulding, a goal of formal education should be to assist students in tentatively finding their own identities or worldviews, yet the student should learn to be flexible and curious and concerned and disciplined enough to engage in lifelong learning.

Examination of Discourse-Unit #96

Whether threat accompanies rigid images, and goodwill goes with flexible ones is a question. Because Boulding The Philosopher does not claim to have any final, unquestionable philosophical answers, presumably Boulding would encourage the advancement of the philosophic study of the science of eiconics. Without a change in the image, no learning occurs. Yet an image may change in a good or bad direction. Presumably an emphasis on philosophic reflection, realistic feedback, and good faith dialogue will help prevent falling in the bad direction (no guarantees, however).

Examination of Discourse-Unit #97

Boulding's point here is that if there are equilibriums in nature, then we know that such systems are at least sometimes possible both logically and in reality. Therefore, creating an equilibrium system,

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should humans wish to do so, is not wild speculation or necessarily impossible; there are concrete grounds for optimism that such a task may succeed. In looking at an ecosystem, Boulding's image that everything depends on everything else is meant to be the beginning, not the end, of the analysis.

Examination of Discourse-Unit #98

Boulding The Philosopher is agnostic or open-minded or noncommittal on the issue of cosmic teleology. There is no absolute guarantee that the future will be better than the past or that humans have a future. (As a practical matter, it seems desirable to think that a better future is at least possible.) Also see the sections entitled "Examination of Discourse-Unit #3" and "Examination of Discourse-Unit #16."

Examination of Discourse-Unit #99

Perhaps a philosophy based on creativity and entropy would be preferable to one built on evolution [variation-selection] and entropy. Since Stevens does not in fact develop and present such an alternative philosophy, however, it is impossible to say. Boulding's approach includes both creativity/variation and selection (along with entropy) as major elements; Stevens' approach may be less appealing in that it apparently only includes

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creativity/variation (along with entropy) as major elements.

Examination of Discourse-Unit #100

Apparently what Boulding is attempting here is to emphasize the importance of an image which is flexible. What is best depends on criteria, but the criteria are embedded in an image with conscious and nonconscious dimensions. One person's image or criteria will differ from another's; one's present image or criteria will differ from one's future image. One should respect the inward teacher of the other person, including one's own image--present, past, future. Accordingly, no one procedure is necessarily best for all inward teachers. For Boulding, flexibility is a virtue (but not the only virtue). Autonomy is also a virtue among other virtues.

Examination of Discourse-Unit #101

Rather than preaching that national defense is not necessary, Boulding wants us to learn that the present international system, if unchanged, may lead to extinction of the human species. It is "the prisoner's dilemma" again. Rather than preaching that national defense is not necessary, Boulding wants us to learn that a new international system is necessary. Our present international image, according to Boulding, is based on (inaccurate) literary knowledge. Scientific research for

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peace would make us more realistic and make it easier to modify the system so as to change the payoffs. In any school system there are certain images which will be encouraged and certain others which will be discouraged; it therefore makes sense to be conscious of this and (always tentatively) decide which images are better or worse. But one should always respect a person's inward teacher even if one is convinced that it is a bad teacher or worldview.

Examination of Discourse-Unit #102

Stevens is engaging in speculation here. Boulding's actual position is that we should always be open to learning but that in the meantime we should attempt to humbly act for human betterment based on our tentative faiths or imperfect hypotheses. Again, the importance of good faith dialogue.

Examination of Discourse-Unit #103

Boulding's generalization here is meant to convey the point that in relative terms social science is more controversial, and the physical and biological sciences are less controversial. Boulding also emphasizes that the physical and biological sciences, like all sciences, are not value-free, but are based on a scientific image. On the other hand, the actual subject matter (humans and human societies) of social science is, in a manner of

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speaking, controversy. A classroom teacher of social science may teach that our Fourth of July celebrations are something like "tribal rites" without disrespecting these rites or the various inward teachers.

Examination of Discourse-Unit #104

Boulding does indeed believe that artistic knowledge is important. But Boulding puts emphasis on science because it necessarily involves a universal good faith dialogue and tends to be more universally accurate than artistic knowledge.

Examination of Discourse-Unit #105

Stevens is again engaging in speculation. Since Boulding favors both the learning of individuals and the macrolearning of organizations, as well as both processes of learning continuing indefinitely, her speculation here appears to be wild or especially unconvincing.

Examination of Discourse-Unit #106

Sometimes Boulding will specify how to implement his insights, sometimes not.

Examination of Discourse-Unit #107

Boulding presumably believes that individual teachers and textbooks are capable of ordering his insights in a variety of ways; presumably Boulding

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considers this preferable to the "one best system" approach. The book Ecodynamics is one possible ordering.

Examination of Discourse-Unit #108

According to Boulding, the classroom teacher should give students the feeling that they can correct their mistakes, rather than the impression that they are not good students and will continue to make mistakes. Boulding admits he does not explicitly know how to do this or whether it is possible for one teacher to teach another how to be a good teacher.

Examination of Discourse-Unit #109

Presumably Boulding believes many different approaches to curriculum are possible and that there is no "one best system." Boulding emphasizes the importance of continuing experimentation. Boulding considers this kind of ambiguity or freedom to be good; clarity or efficiency can sometimes be bad.

Examination of Discourse-Unit #110

Boulding in fact believes that the will-to-truth and the will-to-power differ. Boulding believes that the search for truth can empower people and is preferable to power over people. One can act earnestly on a tentative faith or working hypothesis and still be willing to question it. As a teacher one may encourage certain images and discourage others, even while being open to

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new learning or later modification. At the same time, the classroom teacher can indeed respect each student's inward teacher, no matter how apparently flawed.

Examination of Discourse-Unit #111

Boulding's general attitude is not one of quiet despair but of cautious, realistic optimism. Indeed, Boulding has said more than once that the only unpardonable sin is to despair. Boulding believes that much of what happens in politics involves unpredictable random events.

Examination of Discourse-Unit #112

It is doubtful that Boulding believes that he holds to any idea in an intolerant way. Contrary to what Stevens says, Boulding does not always characterize the war industry negatively. He is convinced, however, of the realistic need (in terms of human survival and betterment) to learn to modify the international system so as to change the payoffs. Boulding believes that his scientifically oriented knowledge of the nation-state system, its pathologies, and alternative international systems is more realistic than the commonly accepted literary knowledge of the international system. In one's research, one necessarily has to decide which knowledges should be advanced and set one's priorities accordingly.

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Examination of Discourse-Unit #113

Boulding believes that planning is important but that flexibility and feedback, not unalterable blueprints, are the way to proceed. And, yes, we should plan to leave some areas unplanned, despite rumors that freedom is unjust or inefficient.

Examination of Discourse-Unit #114

Stevens misinterprets Boulding here. See the section above entitled "Examination of Discourse-Unit #88."

Examination of Discourse-Unit #115

Boulding does indeed believe that some people have more knowledge than others and that this fact should be taken into account. Boulding does not believe that individual learning is enough; he believes that macrolearning, including new social inventions, is also needed.

Examination of Discourse-Unit #116

Stevens is again engaging in wild speculation here. Boulding The Philosopher supports the GRIT proposal, which is a prudent and realistic alternative to unilateral disarmament. Again, Boulding is pointing out that the present international system tends to force us to be nationalists rather than humanists. A modified international system would change the payoffs so as to

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allow and encourage us to be humans first. On the issue of activism or immobility, Boulding is a moderate, advocating a balance between humble political activity and not-so-humble peace research.

Examination of Discourse-Unit #117

Postcivilization is for Boulding a mosaic of many diverse cultures.

Examination of Discourse-Unit #118

There are plenty of people around attempting (perhaps without foresight) to take care of the present conflict-ridden world. Boulding is trying to see ahead and scout some alternative paths (not build highways) for others to consider following in the near or foreseeable future.

Examination of Discourse-Unit #119

Boulding The Philosopher believes that one's behavior is based on one's image. An image contains "faiths" (or "action organizers") as well as a view as to what the external world is like. Realistic feedback is important if we care about either faith modification or responsible action.

Examination of Discourse-Unit #120

Here the reader is referred back to the section entitled "Examination of Discourse-Unit #88."

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Examination of Discourse-Unit #121

Boulding The Philosopher believes that the structure of the environment, not just individual psychology, is important in the teaching-learning situation. He also believes that teaching is more than "mothering." Students must learn to think for themselves in a disciplined fashion, for example. By respecting the student's inward teacher, the classroom teacher can assist the inward teacher in learning how to learn on a lifelong basis. As Stevens' words suggest, perhaps it would be worthwhile to study how the best teachers would implement Boulding's philosophy concretely in the classroom, then make the same kind of study for other more typical teachers and for classrooms of low-achievers.

Examination of Discourse-Unit #122

Contrary to what Stevens says, Boulding does not assume that education can be what teachers want it to be; the sociosphere is highly complex. Some, but not all, of Boulding's educational suggestions lack specificity. But Boulding cannot do everything, nor does he believe in an inflexible "one best system" approach. If a person or teacher does not believe reform is possible, then reform is less likely to occur than when it is believed that reform is possible. According to Boulding, it may be

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that some of the "key" reforms needed for education are located in the larger society.

Examination of Discourse-Unit #123

The question of the proper relationship among government, business, and higher education is one over which experts disagree.

Examination of Discourse-Unit #124

Boulding, by emphasizing the importance of liberal education, lifelong learning, and "the minimum core" of learnings needed by all, does not entirely ignore the student whose terminal degree is a high school diploma. To what extent public education should be responsible for trainings, subjects, and activities beyond "the minimum core" is a question.

Examination of Discourse-Unit #125

Boulding does indeed recognize education as usually of personal economic advantage, but to what extent this should be articulated as a goal of education is a question.

Examination of Discourse-Unit #126

Boulding The Philosopher has more than merely some interesting educational ideas. He gives reasons why his suggested reforms are needed and worthwhile. He also

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recognizes the need for realistic feedback if the educational system is to function as it should.

Examination of Discourse-Unit #127

As a first step, it seems appropriate that Boulding's general social-educational philosophy would be "broad and general." Considering that it is meant to be a first step, Stevens does not appear to be correct in her claim that "Boulding's theory of images is not clearly defined."

Gordon Tullock as Critic

Examination of Discourse-Unit #128

The relatively trivial question here, as Tullock admits, is apparently whether Tullock is historically correct in his assertion that the iconoclasts of Byzantium "were a response to Mohammedan success."

Examination of Discourse-Unit #129

Again we have the question of Boulding's knowledge of territoriality. Here the reader is referred back to the section entitled "Examination of Discourse-Unit #68." Regarding "his judgement here," see also the section above entitled "Examination of Discourse-Unit #50."

Examination of Discourse-Unit #130

This critical discourse-unit fails to allege any false or questionable or inconsistent claim by Boulding.

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Examination of Discourse-Unit #131

Whether Boulding's ecodynamic philosophy is or is not a scientific theory has previously been discussed: See the section entitled "Examination of Discourse-Unit #10." Since our scientific data and knowledge, at least presently, are highly limited, any present attempt at a grand synthesis would necessarily be a fusion of scientific and folk-literary knowledge. Boulding does not claim that his philosophy has great predictive power; indeed, if Boulding's philosophy is correct, any grand philosophy or theory which claimed great predictive power would necessarily be wrong. At a given point in time we have more or less reasonable expectations, but no guarantees. In the absence of evolutionary or ecological knowledge, Boulding uses rational models as a first step toward filling in the gaps of the great ecodynamic jigsaw puzzle. Although incomplete and imperfect, Boulding's ecodynamic philosophy apparently represents a creditable attempt at coherently explaining the course of societal evolution.

John J. Voynich as Critic

Examination of Discourse-Unit #132

Voynich is not correct in believing that Boulding's models of conflict "are predicated on irrational

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behavior" or that Boulding assumes that conflict is "a function of anger and irritation."

Examination of Discourse-Unit #133

The critical concerns of this discourse-unit have been previously addressed. See, for example, the sections entitled "Examination of Discourse-Unit #43" and "Examination of Discourse-Unit #104."

Examination of Discourse-Unit #134

The critical concerns of this discourse-unit have been previously addressed. See, for example, the "Examination of" sections for discourse-units 16, 17, 18, 48, and 50.

Examination of Discourse-Unit #135

The critical concerns of this discourse-unit have been previously addressed. See, for example, the sections entitled "Examination of Discourse-Unit #22" and "Examination of Discourse-Unit #75."

Examination of Discourse-Unit #136

The critical concerns of this discourse-unit have been previously addressed. See, for example, the "Examination of" sections for discourse-units 70, 134, and 135.

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Examination of Discourse-Unit #137

Boulding The Philosopher differs from the Boulding supposedly described in this critical discourse-unit--and in the previous five discourse-units. See, for example, the "Examination of" sections for discourse-units 44, 73, 118, 133, and 136.

General Findings

The results of the above examination will now be summarized as follows:

1. Belief in the existence of Truth (both "factual" and "valuational"), and in the inability of finite humans to find it absolutely, are two key assumptions of Boulding's philosophy.

2. Boulding admits that his theory or vision or philosophy is imperfect and incomplete; he further admits that it contains dangerous simplifications and speculative guesses. He does not claim to have any final or unquestionable philosophical answers.

3. Boulding's philosophy is a fusion of scientific and nonscientific knowledge. Although it provides some explanatory power, Boulding does not claim that his philosophy has great predictive power. Indeed, if Boulding's philosophy is correct, any grand philosophy or theory which claimed great predictive power would

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necessarily be wrong. At a given point in time we have more or less reasonable expectations, but no guarantees.

4. The philosophy of Boulding generally holds up well against its critics. When Boulding is wrong, it is typically a relatively minor point with little significance for his social-educational philosophy. Boulding's philosophy, such as it is, apparently represents a creditable attempt at coherently explaining the historic evolutionary course of human learning and social macrolearning.

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